A COMPUTER ASSISTED GAME FOR TRAINING ARMY CORPS COMMUNICATORS

by

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THESIS

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FOR

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Training Army Corps Communicators

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ABSTRACT

This thesis presents a computer assisted game, based on a current map board exercise at the U. S. Army Signal Center and School, designed to train army officers in the capabilities, organization, and deployment techniques of the Corps Signal Battalion. A team of players using the game direct a simulated signal battalion in a European tactical environment experiencing equipment failures, vehicle failures, and site attacks. The decisions made by the players are similar to those in combat and are entered by means of a remote computer terminal. These decisions include installing and deleting communications systems, connecting and disconnecting equipment, moving vehicles, and establishing communications sites. The computer, acting in the roles of battalion communications personnel, nature, and the enemy, informs the players of its actions by means of the same terminal.

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I. INTRODUCTION

An army corps is a tactical organization larger than a division and smaller than a field army. It consists of a tactical headquarters capable of controlling from two to seven divisions and auxiliary arms and services. The actual number and type of divisions assigned to a given corps is tailored to accomplish a specific mission and will vary significantly with the mission. The administrative and logistical support provided by the corps is minimal with primary responsibility for these tasks assigned to the field army and divisions.

One factor necessary for efficient operation of a corps is an effective tactical communications system. The basic requirement of this system is the support of the units combat operations. To satisfy this requirement the system must provide rapid, reliable, secure interchange of information and orders within and between echelons of the headquarters it serves and to major subordinate units. The size of the corps organization requires that the communications system be large and complex - involving many different types of equipment located throughout the corps area of operations.

The communications are provided for a corps by both an organic signal battalion and field army signal personnel. The Command Communications System, a system linking only major corps and subordinate headquarters, is provided by the Corps Signal Battalion. Field army signal personnel provide an Area Communications System which serves both as a backup to the Command System and a means for providing communications for units not served by the other system.

The size and complexity of the communications needed to support a corps requires highly trained signal corps personnel to plan and operate the communications systems. Providing these personnel is a continuous problem due to frequent assignment changes, limited training time and funds, and the need for diversity in assignment for signal corps officer At the present time instruction in corps communications doctrine and techniques is given primarily in a number of signal corps Military Occupational Speciality (MOS) courses and the Signal Officer Advanced Course. In this instruction the capabilities and limitations of the equipment available are discussed as well as the standard techniques of employment. In the Signal Officer Advanced Course considerable time is spent with a map board exercise in an effort to play a tactical scenario which introduces, and presents proposed solutions to, some of the problem areas encountered in the field.

The optimal method of training officers in corps communications is achieved by field exercises in which the student actually participates in a dynamic training exercise and experiences first hand the problems which arise. Unfortunately this method is not practical when the large number of officers to be trained is considered. Field exercises are time consuming, extremely expensive, and are capable of training only a small number of officers with each exercise.

Map board exercises on the other hand take less time, are relatively cheap, and by training many table groups at one time are able to accommodate a sizable number of officers. There are many problems, however, associated with map board exercises. Typically, requirement or problem sheets are distributed to a large number of table groups and the groups are then given enough time to arrive at solutions. When the group

solutions are formulated the instructor presents the "school solution" and the groups compare their results to it. Unfortunately the requirements usually have many acceptable solutions and the group differing from the school solution is frequently unsure of the merits of its result. Since the exercise usually proceeds at the pace of the slowest table there is considerable wasted time. Complex interrelationships present in operational units and field exercises are impossible due to the manual bookkeeping that would be required. As a result of the relatively simple, clean problems necessary for this type of teaching one or two members of the group typically perform the bulk of the work leaving the other two or three members little to do resulting in little benefit to them.

The purpose of this thesis is to present a computer assisted game for use as a teaching vehicle to supplement and partially replace current map board exercises used in corps communications instruction. The game allows the players to simulate the deployment and operation of a Corps Signal Battalion in a tactical scenario facing problems similar to those in a combat operation. The use of the computer allows a dynamic, realistic approach to learning which includes equipment failures, vehicle movement, sites attacks, and detail in scenario and player response not possible in manual map board exercises. Wasted time is drastically reduced since the game proceeds at the pace of the single group using it.

Although the program was developed primarily for use as a teaching vehicle it might also be used for evaluating new corps communications techniques and proposed changes in doctrine. By employing the game a large number of times using the proposed change in doctrine a representative outcome may be obtained and this outcome compared to that using current doctrine. The sensitivity of various proposed doctrines to changes in the level of conflict may also be examined by changing internally stored parameters.

The game was constructed in a general form to allow it to be easily converted to signal units other than the Corps Signal Battalion (e.g., Division Signal Battalion, Airborne Corps Signal Battalion). Other possible applications are varied and include such diverse areas as power transmission and transportation problems. Other applications are covered in more detail in a later section of this thesis.

II. DESCRIPTION OF THE GAME

A. GENERAL

The computer assisted game developed for this thesis allows a group of four to seven students playing it, under the supervision of an instructor, to act as planners and operational decision makers for a Corps Signal Battalion area of operations in a hypothetical Western European campaign. The scenario used in the game is the same as one currently being employed in the Signal Officer Advanced Course at Ft. Monmouth, New Jersey and is considered mid-intensity. A description of the tactical scenario used is included in Appendix B.

It is assumed in this section that the reader is familiar to some extent with the organization and employment of the Corps Signal Battalion. A short description of the Corps Signal Battalion is given in Appendix A and more detailed information is available in References 2 to 4 of the Bibliography.

During the course of the game the computer plays three different roles - signal battalion personnel, nature, and the enemy. It acts as signal battalion personnel when it implements the instructions given to it by the players. It performs the role of nature when it introduces equipment failures based on the actual failure distributions of the individual items of equipment. Finally it simulates the enemy when it introduces site attacks and subsequent equipment damage.

The team of players, on the other hand, attempt to make optimal use of the equipment organic to the Corps Signal Battalion by intelligent initial equipment placement and equipment change commands during play.

Placement and changes made by the players are similar to those encountered by a signal battalion in the field. All computer introduced actions are reported to the players by messages typed on a remote teletype terminal attached to the computer. Likewise player commands are transmitted to the computer by means of the same terminal.

The play of the game is divided into two phases - a setup phase and a free play phase. The following sections describe each of these phases in some detail.

B. SETUP PHASE

In the setup phase the players study the tactical scenario, which is basically a corps in the defense preparing for resumption of the attack, and choose locations for the communications sites and major items of communications equipment. They then order communications installed between the sites.

1. Site Input

The players choice of site locations is based primarily upon the location of the major corps and subordinate headquarters they must provide communications for and the terrain of the area of operation. They must choose the site location close enough to the supported headquarters to be able to provide communications for them but the location must also have radio line-of-sight if certain communications equipment is to be used.

When players enter each site location with its grid coordinates the computer compares the location to that of the major corps and subordinate headquarters. If the site is sufficiently close to a headquarters to provide communications support it is automatically assigned

as a site supporting that headquarters. If it is not sufficiently close to a major headquarters it is classified as a radio relay site.

Because of the different equipment types usually employed at corps main, alternate, and artillery headquarters a greater distance is allowed between these sites and supported headquarters. A maximum of thirty sites may be located.

2. Systems Input

Once the communications sites are located the players order communications systems established between them. Three types of systems are possible - multichannel cable, radio relay, and high frequency. Each multichannel cable and radio relay system is capable of transmitting twelve voice circuits while the high frequency systems transmit only one per system. The number and type of systems between the sites is determined by communications doctrine, player judgement, terrain, and equipment limitations.

3. Communication Vehicle and Generator Placement

In order to provide communications equipment to establish the systems which have been ordered installed the players next distribute the communications vehicles and generators organic to the battalion among the sites in the corps area. This placement includes vehicles used for backup as well as those needed for system installation.

Four types of communications vehicles are located in addition to generators:

(1) AN/MRC-103 (Radio Repeater)
(2) AN/MRC-102 (Radio Terminal)
(3) AN/MCC-6 (Telegraph-Telephone Terminal)
(4) AN/GRC-26 (Radio Terminal)

When this data is entered the computer has enough information to assign individual radios and multiplexers to the systems ordered

installed. Since the communications planner in the field who is concerned with the overall corps communications picture normally does not determine which of the individual items of equipment in the vehicles are used on particular systems (this is left to site operating personnel) the game does not require this detailed information. In assigning equipment to systems the game uses the same logic a site operator would use as to choice of vehicle type, number of spare pieces of equipment for each vehicle, etc. The Program Construction section of this thesis discusses the equipment assignment proceedure in more detail. If the players did not place enough equipment at a site to establish the ordered systems a message is printed at the terminal informing them of the site number where the problem occured and the system type. All equipment is considered operational for the setup phase of the game.

Upon completion of the setup phase a master table of equipment placement and systems for each site is printed as well as a table giving generator location and status. Since these tables are lengthy they are printed offline on a high speed printer. Appendix D gives a typical printout of these tables for a sample equipment placement.

C. FREE PLAY PHASE

When the initial input is entered by the players and the detailed assignment and checks are performed by the computer the game enters the free play phase. In this phase the players react to a simulated campaign by experiencing problems and making decisions similar to those in the field. The computer acting as nature and the enemy introduces communications equipment failures, vehicle failures, repairs of failed items, and site attacks resulting in damaged or destroyed equipment. The players respond

to the computer introduced messages by disconnecting and connecting equipment on systems, deleting old systems and installing new ones, moving vehicles, and establishing new sites.

1. Computer Introduced Actions

The players are notified of all computer introduced actions by messages printed at the teletype terminal. A brief description of these actions follows in this section with more detailed information available in the Program Construction Section.

a. Communications Equipment Failures

Communications equipment failures occur on the major items of communications equipment located throughout the battalion. These include radio AN/GRC-50, radio AN/GRC-26, and multiplex AN/TCC-7. Times to failure for each item of communications equipment above is assumed to be distributed with a truncated normal failure distribution.

During the setup phase each piece of communications equipment is assigned a number of minutes of operation until its first failure. When this time is reached the equipment fails and the players are notified. Only equipment which is connected to a system is allowed to fail since it is assumed that all others are on standby. Likewise the number of minutes until failure for a piece of communications equipment is strictly minutes connected to a system.

Although it is assumed that all equipment is operational when the game enters the Free Play Phase it is not assumed that all equipment is newly repaired. To allow for this the first failure times are sampled from an approximation of the equilibrium distribution of the truncated normal failure distribution associated with the item. Subsequent failure times for the same item are sampled from the truncated normal failure distribution itself.

When the equipment fails the system to which it is connected must become non-operational if it was operational prior to the failure. If the equipment causes a system failure the players are notified of this event by a message.

Since a signal battalion in the field has the means to repair most failed items of equipment provision was made in the program for repair. As soon as an item fails a time for repair is determined by taking a sample from a truncated normal repair time distribution for the appropriate type of equipment. This actual time for repair provides a basis for providing the players with an estimated time of repair. By using the actual repair time as the mean of another distribution the player is provided with a printed estimate.

b. Communications Equipment Repair

Communication equipment repairs occur on the same items of communications equipment as failures. When the time for repair, determined when the item failed, has elapsed the players are notified that the equipment is again operational. If the equipment is still connected to a communications system the system is checked to determine if it can now become operational. If it can the student is notified that the system is working.

c. Generator Failure and Repair

Generator failure times are computed in a manner similar to communications equipment failures. Since generators are assigned to sites and not to specific systems, however, all generators are assumed used and subject to failure. As in communication equipment failures a repair time is established and the players are provided with an estimate of this time. Similarly, when the generator is repaired the players are notified of the event.

d. Vehicle Failure

The four types of vehicles placed in the Setup Phase are allowed to fail in the Free Play Phase. A failure for a vehicle implies that a mechanical breakdown has occurred and it is assumed that these happen only during transit.

A failure time (in km of road distance traveled until scheduled failure) is generated for each of the vehicles during the Setup Phase of the game from the equilibrium distribution associated with each vehicle type. A truncated normal distribution is again assumed to be the failure distribution of the vehicle type. The second and subsequent failure times for a vehicle are sampled directly from the assumed truncated normal distribution.

When a failure occurs a time until repair (in minutes) is calculated from a repair distribution and the vehicle is considered repaired after this amount of time has elapsed. An estimate of the time for repair is provided for the players when the vehicle failure message is printed.

e. Vehicle Repair

Vehicle repairs are effected for failed vehicles when the time for repair described above has elapsed. When a vehicle is again made operational the players are notified and the vehicle continues its simulated trip to the ordered destination.

f. Site Attack

Signal sites are an effective command and control instrument of the corps commander and are often isolated from major combat units. As such they are frequent targets for enemy attacks and when this occurs equipment is usually damaged or destroyed causing systems at the site to become non-operational and vehicles unable to move.

In the game signal sites are divided into three catagories: (1) low risk, (2) medium risk, and (3) high risk. The low risk catagory contains corps main, alternate, and artillery and is designated as low risk because of the sites proximity to major headquarters. Medium risk sites include all others except radio relay sites which are high risk because of their isolation.

During the Setup Phase of the game a time is established for an attack on each site by sampling a uniform distribution associated with the risk catagory of the site. When sufficient play time has elapsed for the attack players receive a message that the attack has occurred.

Associated with each risk catagory is a probability p that a vehicle or piece of communications equipment has been damaged upon attack. Each vehicle and piece of communications equipment subject to failure is inspected and if operational caused to fail with probability p. The value of p associated with low risk sites is the smallest due both to the amount of equipment located there and the speed with which assistance can be expected. High risk sites, on the other hand, have the largest value of p because of their isolation.

The players are notified of any equipment failures due to the attack and these failures are handled identically as those described in sections a through e above.

2. Player Initiated Actions

Since the computer, playing the roles of nature and the enemy, is periodically changing the status of the communications network installed by the simulated battalion provision has been made to allow the players to react to these changes. By typing desired changes on the remote

teletype the players are able to take corrective action similar to that required in actual combat. The player initiated actions, described briefly below, are discussed in more detail in the Program Construction Section.

Players are provided the option of issuing commands when either thirty minutes of play has elapsed since their last opportunity or after a computer introduced action has occurred - whichever happens first. At these times the players are allowed to introduce as many commands as they desire.

a. Remove Communications Equipment from System

The players are allowed to remove the three types of communications equipment discussed above from communications systems. They do this by specifying the type of equipment, the site number, the system number, and the type of system when necessary. Since it takes little time to disconnect an actual piece of communications equipment from a system the disconnect is accomplished immediately by the computer. If the removal of this piece of equipment makes the system inoperative the players are notified by a printed message. If the command cannot be accomplished, possibly because no system exists at the site with the specified system number or the equipment has already been disconnected, the players receive a message to that effect.

b. Install Communications Equipment on System

The same three types of communications equipment which can be removed from systems may also be installed on systems. The players accomplish this by specifying the equipment type, site number, system number, system type, and vehicle number for the installation. Since installation of communications equipment is not instantaneous the computer determines the time required for installation by taking a sample from a

stored truncated normal installation time distribution. Upon receiving the installation command the players receive a reply that the installation has begun. After the installation time has elapsed the players receive another message that it has been completed. If the installation of this item is sufficient to make the system involved operational the status of the system is changed and the players are notified.

As in the removal case if the command is impossible to accomplish because of lack of equipment, no existing system, or equipment already connected the players receive a message informing them of the problem.

c. Remove System

The players may remove existing systems by supplying the computer with the system type, number, and sites involved. It is not necessary to remove the equipment from the system since this command also removes connected equipment. System removal is accomplished immediately upon command and the players are notified of its completion and of any communications equipment removed. Commands of this type which cannot be executed are again refused and the players notified of the reason.

d. Install Systems

Installation of systems is accomplished by providing the computer with the system type, number, and sites involved. Systems are installed without communications equipment and as such are non-operational. Players use the communications equipment installation command to inform the computer of the specific radios and multiplex equipment to be used. Installation is accomplished with no delay and the players are informed if the command cannot be executed due to an existing system of the same type and number between the sites involved.

e. Move Vehicles

Players may move vehicles and generators between communications sites by providing the computer with the vehicle type, location, and destination. A preliminary transit time, based on the distance between sites, is calculated by the computer upon receipt of the command. The actual transit time is computed by sampling a truncated normal distribution with the preliminary transit time used as the mean.

If the command can be executed the players receive a reply that transit has begun immediately after the command has been entered. Another message is printed when the vehicle arrives at its destination. If a vehicle failure occurs during transit the players are notified in the manner described in the vehicle failure section.

The move vehicle command is not implemented by the computer if the vehicle is not located at the site indicated, it is non-operational, if communications equipment in the vehicle is still connected to a system, or the destination site does not exist.

f. Install Site

The players install new sites by simply giving the grid coordinates of the new location and providing a site number. In a manner similar to the Setup Phase the computer determines if the site is supporting a tactical headquarters or is a radio relay site. This command is not accepted, and the players notified, if there already exists a site of the same number. Communications equipment and vehicles must be moved to the site by the vehicle movement command.

g. Information Commands

As the game progresses numerous changes are made in the deployment of, and communications provided by, the Corps Signal Battalion.

Even though it is recommended that the players maintain communications status charts on acetate covered boards to facilitate easy updating and reference it is possible for mistakes to be made.

In the event of a question concerning any or all of the sites the players may utilize information commands provided to print tables describing the current status of equipment and systems. Commands provide the option of printing at the teletype terminal that segment of the master table of equipment placement and systems involving a single site. This table provides information on all the vehicles located at the site, their operational status, the systems currently using the communications equipment in the vehicles, the status of the systems, and the deadlined equipment for the vehicles. If this information is desired on all sites it is automatically printed offline on a high speed printer. A table is also available listing the location and status of generators in the battalion.

D. EVALUATION OF PLAY

The game may be terminated at any time desired by issuing the game termination command. Although it would be desirable to have tables of play statistics such as system outage times, equipment deadlined times, and number and type of vehicle movements, the time available for formulating this thesis did not allow these to be included.

The primary value of the game is the insight into the problems and interrelationships present in a Corps Signal Battalion in the field. Players learn from their own mistakes and gain experience in the decisions required. Their knowledge of the capabilities and limitations of the available equipment is also reinforced.

Evaluation of the quality of student play and constructive suggestions are provided by the instructor who supervises the play of the group. By discussing key decisions and overall philosophy during and after the game the players acquire further insight into the techniques of deploying and operating the battalion.

III. INSTRUCTIONS FOR USE OF THE PROGRAM

A. INPUT/OUTPUT

Input data for the setup phase of the game may be entered either manually at the remote terminal or from data on punched cards. Input for the free play phase will always be entered at the remote terminal. All data entered into the game is in integer format and with the exception of the gameword and random number entries explained below an image of the input data is typed on the terminal immediately after its entry. The image provided by the computer allows the players to check if the input data was placed in the proper fields. Whenever input data is required at the terminal a message is printed indicating the information required and X's are placed on the terminal printout indicating the exact location of the fields in which to enter it. All input is numerical and if the field provided is larger than the number to be entered the input data must be right justified in the field.

B. GAME PLAY

1. Setup Phase

The setup phase of the game consists of game initialization, the entering of site locations, systems required, and equipment location, and the computer checks of this data.

a. Gameword

The first data request when starting the game is the message 'ENTER GAMEWORD'. The gameword is a two digit binary number which specifies the input/output options to be used. The players should enter the combination in Table I desired.

First Digit

0	Setup phase data to be entered at terminal
1	Setup phase data to be entered by punched cards

Second Digit

0	All output to be printed at terminal
1	All complete master tables and initial generator placement table to be printed offline

Gameword Values

Table I

b. Random Number

When the gameword has been entered a request 'ENTER ODD RANDOM NUMBER' is typed at the terminal. Although a field of seven digits is provided any odd number of seven or less digits is acceptable. The random number is used to start the assignment of those internal parameters determined by sampling distribution functions. Using the same random number on two different plays of the game will cause the initial equipment failure times, site attack times, and vehicle failures to be the same for each game.

c. Site, System, and Vehicle Placement Data

Site, system, and vehicle placement data is entered after the random number and the input is the same whether entered at the terminal or by punched cards. If the data is entered at the terminal instructions and fields are printed informing the players of the information desired. The advantage of using punched cards is in the time saved for input since cards may be punched prior to actual game play and read in at the time of play. If punched cards are used a copy of how the data would have appeared if entered at the terminal is automatically printed offline for easy reference.

The data requested is divided into three sections: (1) site placement, (2) system installation, and (3) vehicle placement. For site placement first the total number of sites is entered and then the grid coordinates of the individual sites. For systems, radio-relay are entered first followed by multichannel cable and high frequency. For each of these the total number of systems of a given type is entered first followed by the system number, from site, and to site. Vehicles are entered in the order AN/MRC-102, AN/MRC-103, AN/MCC-6, AN/GRC-26, and generators. For each type the number of sites at which vehicles are to be placed is first entered followed by individual site numbers with the number of vehicles to be placed at the site.

If data is entered at the terminal the players have the option of making changes or corrections to it immediately after each block is entered. They made changes or corrections after replying affirmatively to a query by the computer after the desired block is entered.

When all data has been entered the computer prints error messages at the terminal if enough equipment has not been located to provide the systems ordered installed. A complete master table and a table of generator placement is printed at the end of the setup phase.

2. Free Play Phase

The free play phase is entered automatically after the setup phase. Players are given the option of entering commands after each thirty minutes of simulation time or a computer introduced action - whichever occurs first. Computer introduced actions are discussed in the Description of the Game section. The simulation day and time is printed each time the players are allowed to enter a command. If no action is desired the command '000' allows the game to proceed. If

additional information is required to execute a command the players are asked by the computer to provide it after the initial command submission. Player commands available are listed in Table II. A description of the commands is also given in the Description of the Game section.

C. GAME TERMINATION

Termination of the game is accomplished by a player command of '999'.

Command	Description
100	Complete master table is printed
1XX	Master table segment for site XX is printed
150	Complete generator placement table is printed
201	Remove AN/GRC-50 from system
202	Remove AN/TCC-7 from system
203	Remove AN/GRC-26 from system
301	Install AN/GRC-50 on system
302	Install AN/TCC-7 on system
303	Install AN/GRC-26 on system
401	Remove cable system
402	Remove radio-relay system
403	Remove high frequency system
501	Install cable system
502	Install radio-relay system
503	Install high frequency system
601	Move AN/MRC-103
602	Move AN/MCC-6
603	Move AN/MRC-102
604	Move AN/GRC-26
605	Move generator
701	Install site

Player Commands Available in Game

TABLE II

IV. PROGRAM CONSTRUCTION

A. GENERAL

The computer assisted game presented in this thesis employs the next-event simulation construction technique discussed in detail in reference (1). Although the game was written in FORTRAN IV many of the more powerful commands available were not used in order to simplify the task of transferring the program to other computers having only a modified FORTRAN II capability. The program was constructed using an IBM 360-67 computer with a time sharing system.

Little effort was made to reduce the computation times involved in the program since this occupies only a small fraction of the total play time. Most of the play time is consumed by the players analyzing the tactical environment and choosing their course of action. Complex constructions were avoided and some redundancy was allowed in order to make the program logic clear enough to allow future additions and changes by users of the game. Numerous comment cards were also inserted for this purpose.

B. OVERVIEW OF CONSTRUCTION

Four types of simulation units are used in the program: (1) communications vehicles, (2) communications equipment, (3) communications systems, and (4) communications sites. The simulation units are integer variables, each representing a single piece of equipment, a system, or a site. They are made up of packed numbers which completely describe the state of all simulated equipment and systems. Table III provides a summary of the simulation units and array names.

Description	State Variable	Designation	Array Name
Radio Site	Unit supporting XX XXXXXX location	N/A	LOCSIT
Radio and Cable Systems	op/non-op flag to X XX XX X from system number	Radio Relay	IRRSYS
		High Freq.	IHFSYS
		Cable	ICBSYS
Communications Vehicles	transit flag, op/non-op flag XXXX XX X X km until site next at failure	AN/MRC-102	IM102
		AN/MRC-103	IM103
		AN/MCC-6	IMCC6
		AN/GRC-26	IV26
		Generator	IGEN
Radio and Multiplex Equipment	op/non-op veh type flag X XX XXX X X veh # / sys type sys # to site #	AN/GRC-26	IGRC26
		AN/GRC-50	IGRC50
		AN/TCC-7	ITCC7

Vehicle Type

1 - AN/MRC-102
2 - AN/MRC-103
3 - AN/MCC-6
4 - AN/GRC-26

System Type

1 - Cable
2 - Radio Relay
3 - High Freq.

Simulation Units

TABLE III

	unit type		
IEVCAL (I)	XX	X	XXX
	type		unit #

JEVCAL (I)	XXXXXX
	time in minutes

Type

1 - Equipment failure
2 - Equipment repair
3 - Equipment installation complete
4 - Vehicle movement complete
5 - Vehicle breakdown
6 - Vehicle repair
7 - Site attack

Unit Type

1 - AN/GRC-50
2 - AN/TCC-7
3 - AN/GRC-26
4 - Generator
1,6 - AN/MRC-103
2,7 - AN/MCC-6
3,8 - AN/MRC-102
4,9 - AN/GRC-26
5,10 - Generator

Events in Future Events Table

TABLE IV

Seven types of simulation events are created internally by the computer and stored in the future events table. Simulation events are used to implement computer introduced events which may or may not be a result of past player introduced actions. Table IV provides a summary of internally created events.

C. SUBROUTINE CONSTRUCTION

The following sections provide a short description of the main program and twenty-nine subroutines used in the program with gross flow charts included for major subroutines. A complete listing of the program is included in a later section of the thesis.

1. Main Program

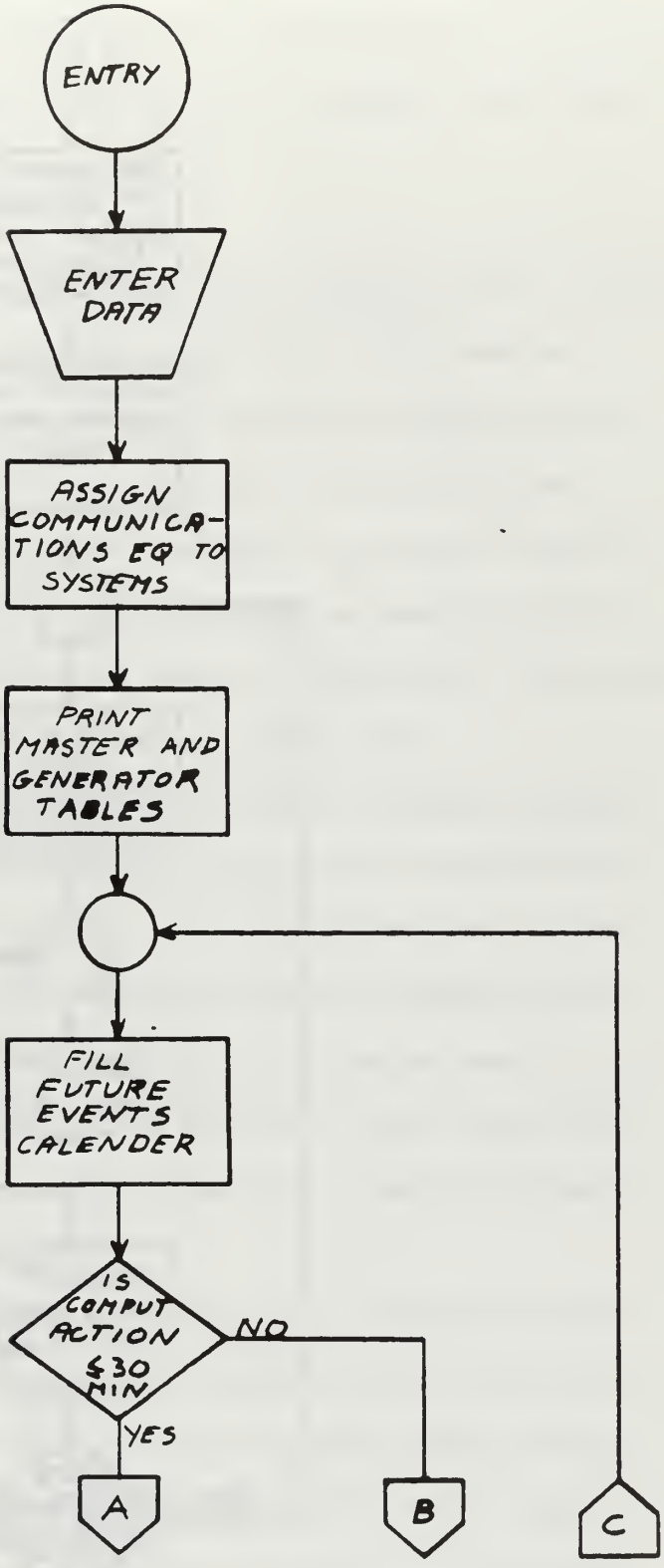
The main program (Figure 1) serves two primary functions. During the setup phase of the game it is a calling routine which causes data to be read, equipment assigned, and initial tables to be printed. During the free play phase it determines when computer introduced events are to be used and accepts and processes player introduced decisions.

2. Subroutine INPT

Subroutine INPT accepts data for the setup phase of the game either from cards or directly from the terminal. This subroutine also calls the initial failure time program discussed below (INFAIL) to determine the time of first failure for communications equipment and vehicles.

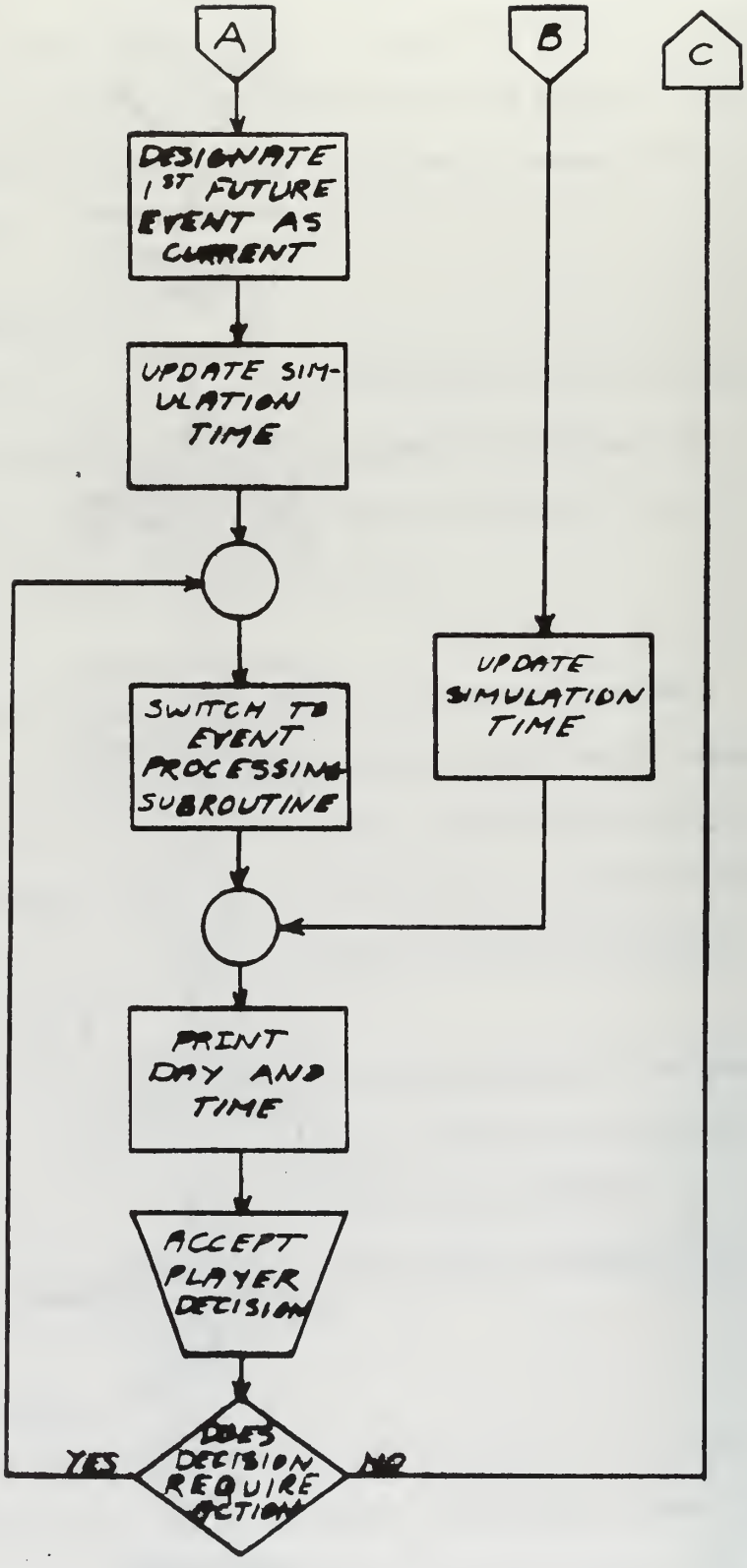
3. Subroutine ASSIGN

Subroutine ASSIGN first assigns radios organic to the battalion to communications vehicles for internal bookkeeping purposes and then assigns the battalion communications equipment which was placed by



MAIN PROGRAM

Figure 1



MAIN PROGRAM (Cont.)

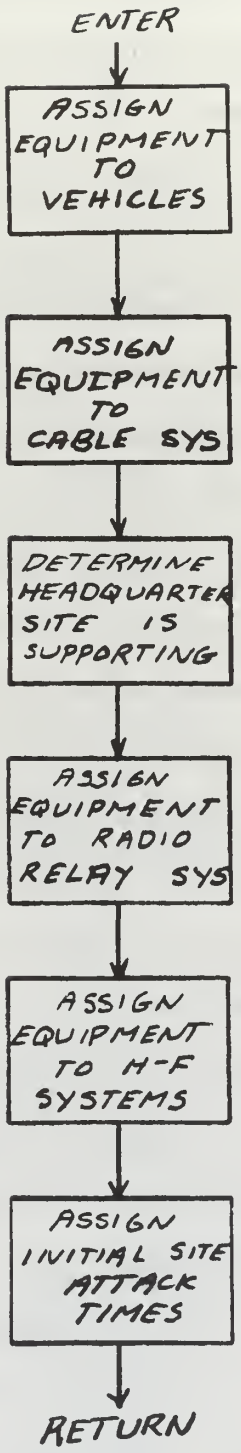
the players to the systems ordered installed. The designation of the headquarters which the sites are supporting is determined and the initial site attack times are computed. Figures 2 to 6 illustrate the construction of this subroutine.

4. Subroutine INFAIL

Subroutine INFAIL (Figure 7) is used to assign initial failure times to both communications equipment and vehicles. The need for a separate subroutine for this task, rather than simply taking a sample from the appropriate truncated normal time to failure distribution, is the assumption that all communications equipment and vehicles have been operating for an undefined period of time and are not newly repaired. As a result of this some equipment may be close to failing while others may have been operating after repair only a very short time.

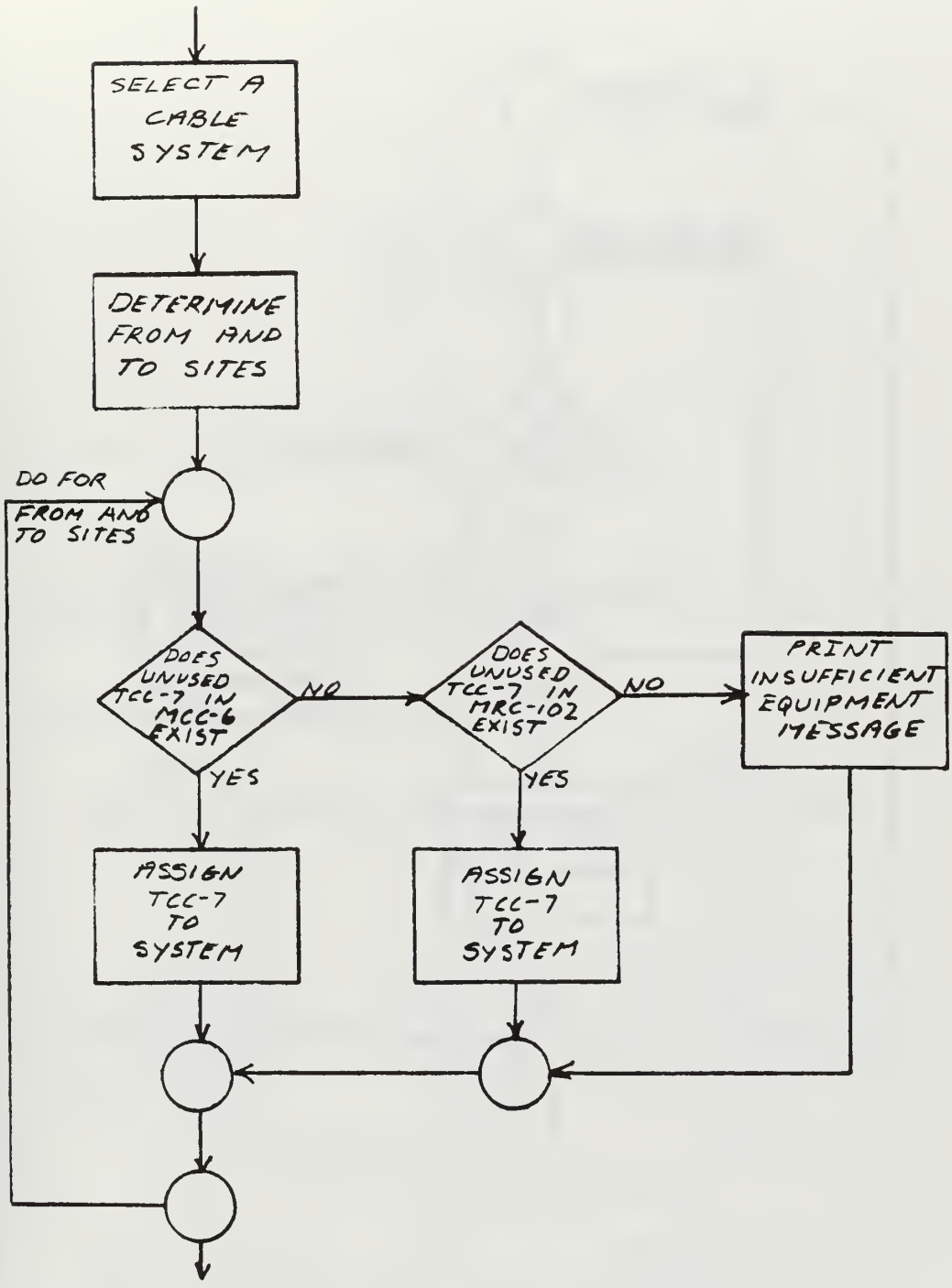
The goal of this subroutine is to provide a sample from the equilibrium distribution of the truncated normal failure distribution for an item (see Reference 8 for a discussion of renewal theory mathematics). Although a mathematical technique exists for determining the exact form of the equilibrium distribution by integrating over the tail of the failure distribution function the truncated normal distribution function, which cannot be expressed in closed form, does not produce a closed form result upon integration.

The method used in INFAIL to approximate a sample from the equilibrium distribution is to choose an arbitrary time t to use as a comparison time. Samples are taken from the truncated normal failure distribution of an item and added together until their sum is equal to or greater than t. The difference between the sum and t is an approximate sample from the equilibrium distribution.



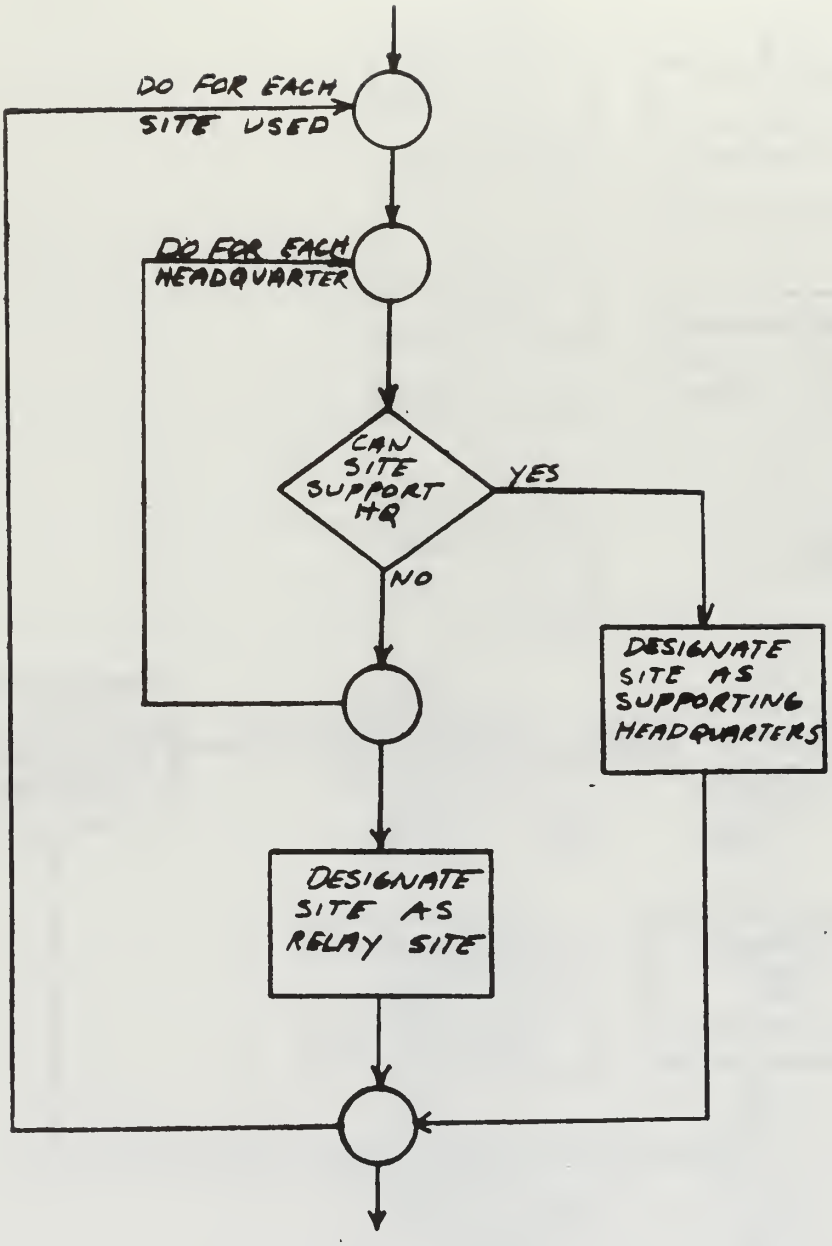
Subroutine ASSIGN

Figure 2



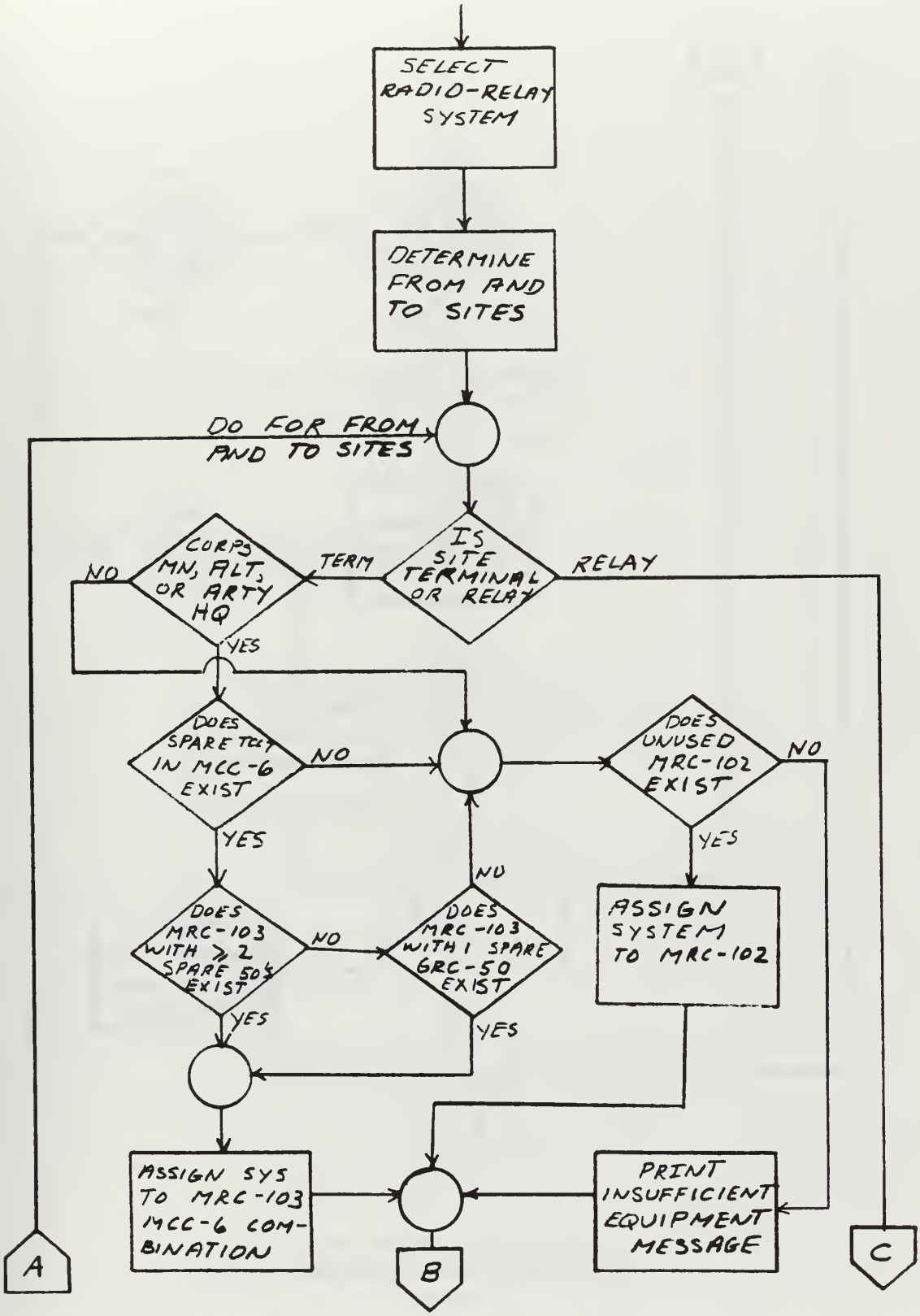
Cable System Assignment

Figure 3



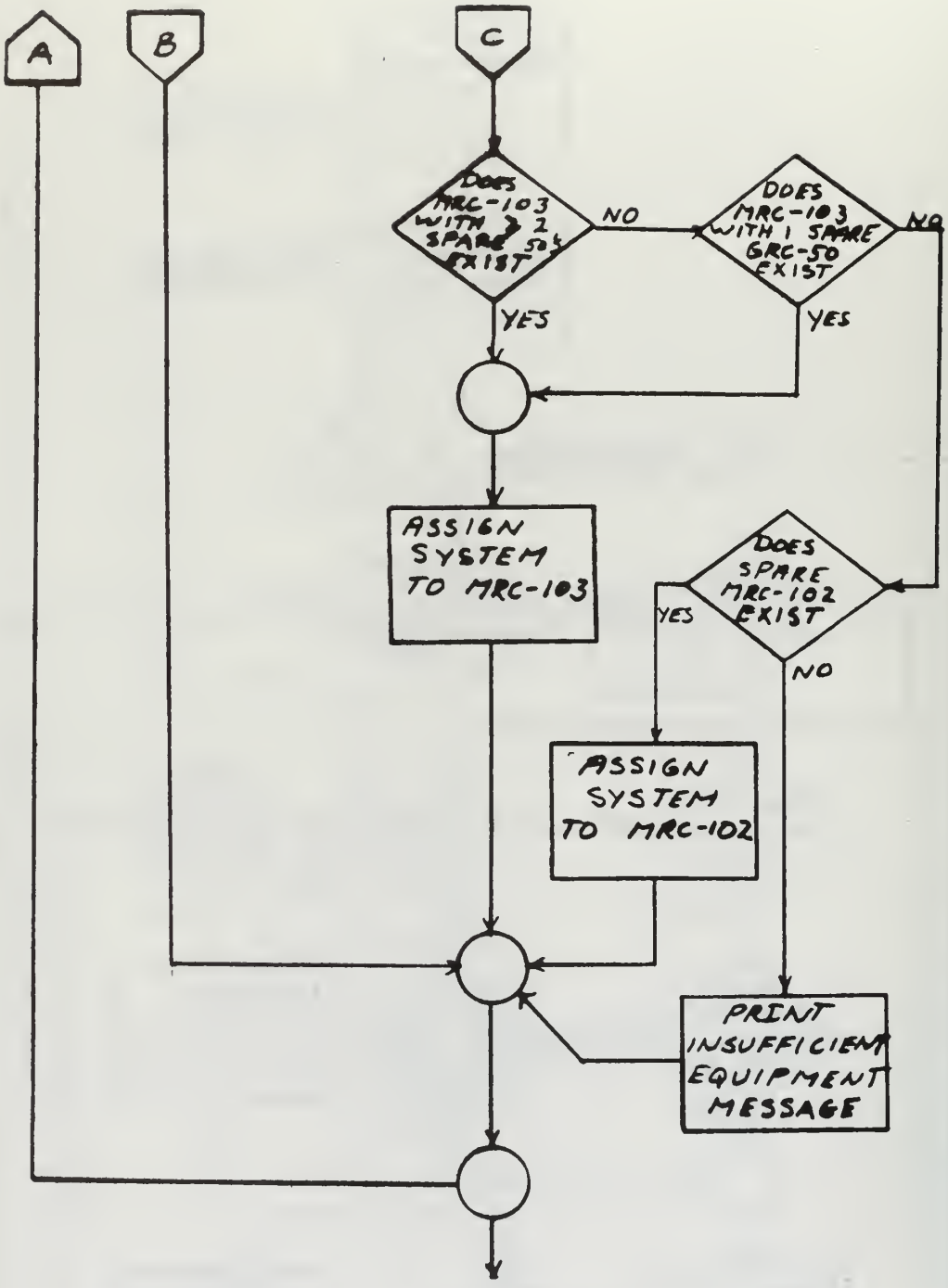
Headquarters Assignment

Figure 4

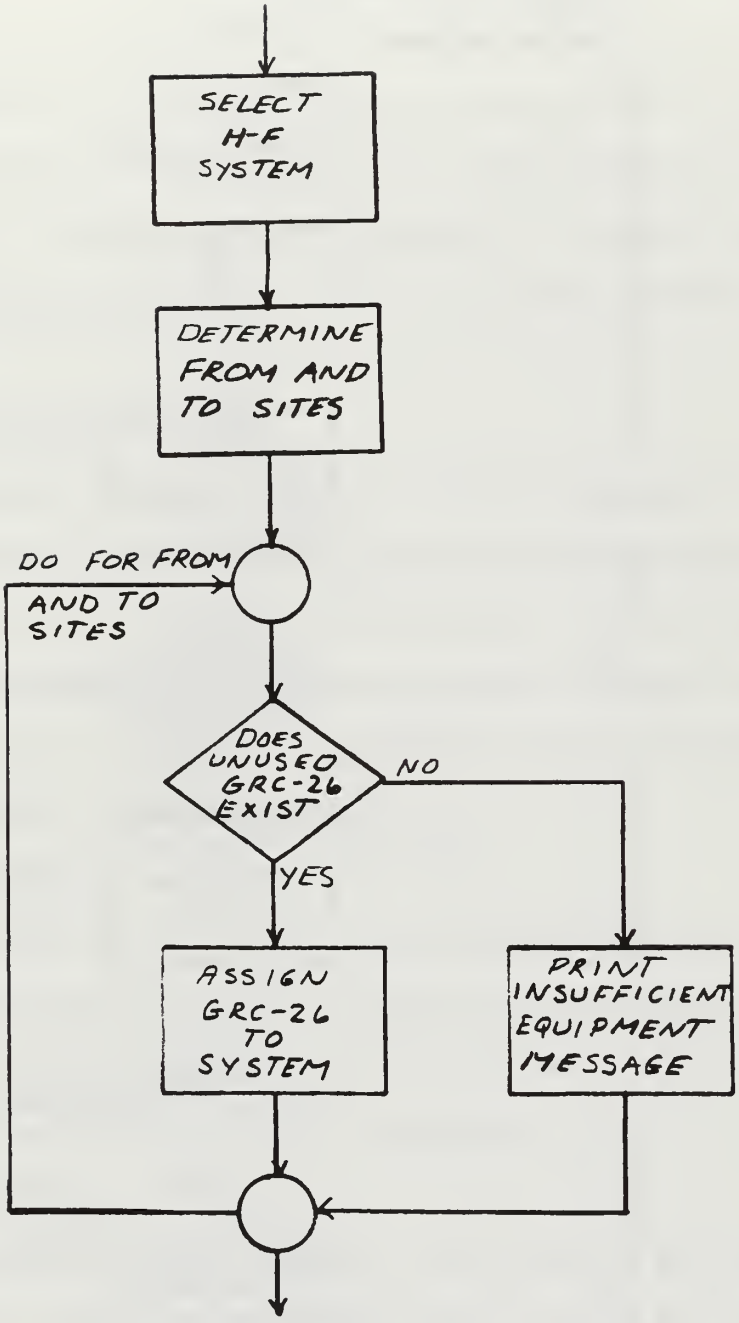


Radio Relay System Assignment

Figure 5

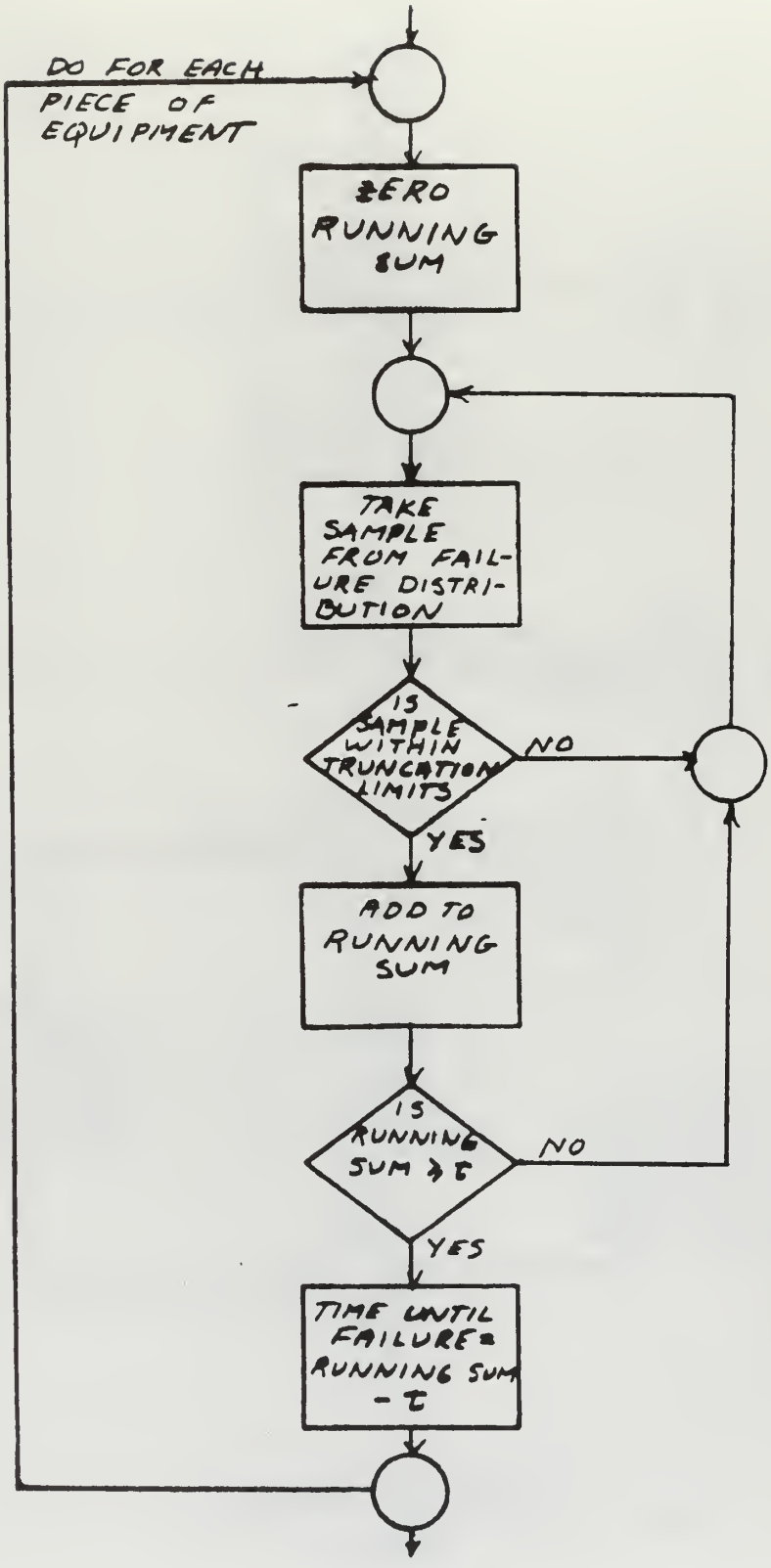


Radio Relay System Assignment (Cont.)



H-F System Assignment

Figure 6



Subroutine INFAIL

Figure 7

The accuracy of the approximation depends on the parameters of the failure distribution, truncation limits, and t. As t gets large without bound the resulting distribution approaches the true equilibrium distribution. Unfortunately as t is made larger more samples must be taken from the failure distribution resulting in larger computational times. The values of t used in the program were determined by a separate analysis which compared the changes in the approximated equilibrium distribution as t was varied.

5. Subroutines TABLE and TABLE1

Subroutine TABLE is used to examine the simulation units in order to produce a table of the status and location of communications vehicles by site. When the complete table is printed it orders the sites numerically and gives supported headquarters and grid coordinates of the site. Subroutine TABLE1 is used to print individual lines of the table after they are generated by subroutine TABLE.

6. Subroutine SYSOP

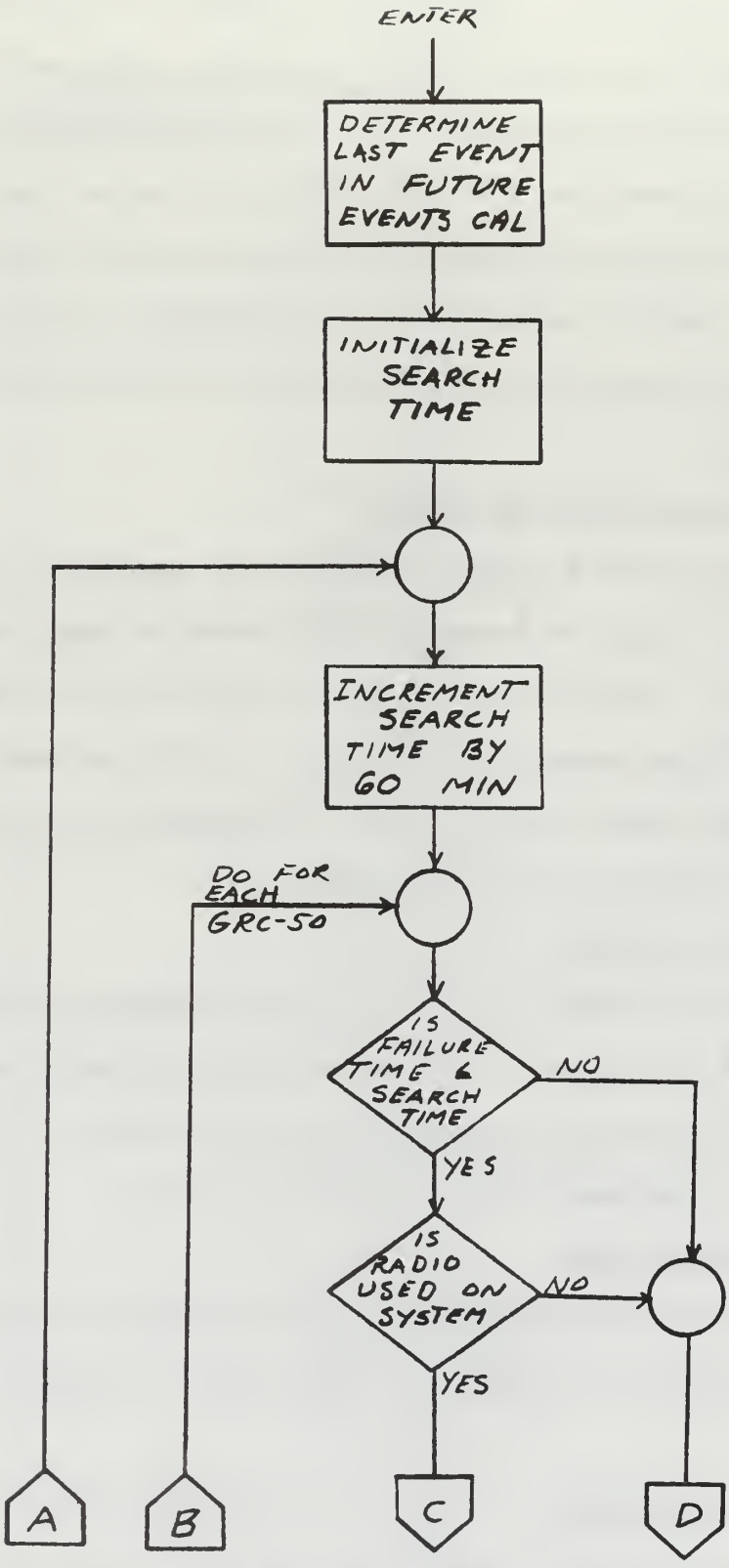
Subroutine SYSOP is used to locate and determine the operational status of the system unit in the appropriate system array when provided with the terminal site numbers and system number. If the system does not exist an indicator to that effect is returned.

7. Subroutine GENTAB

Subroutine GENTAB produces a table of generators by site number. The number operational, deadlined, and total number are given for each site.

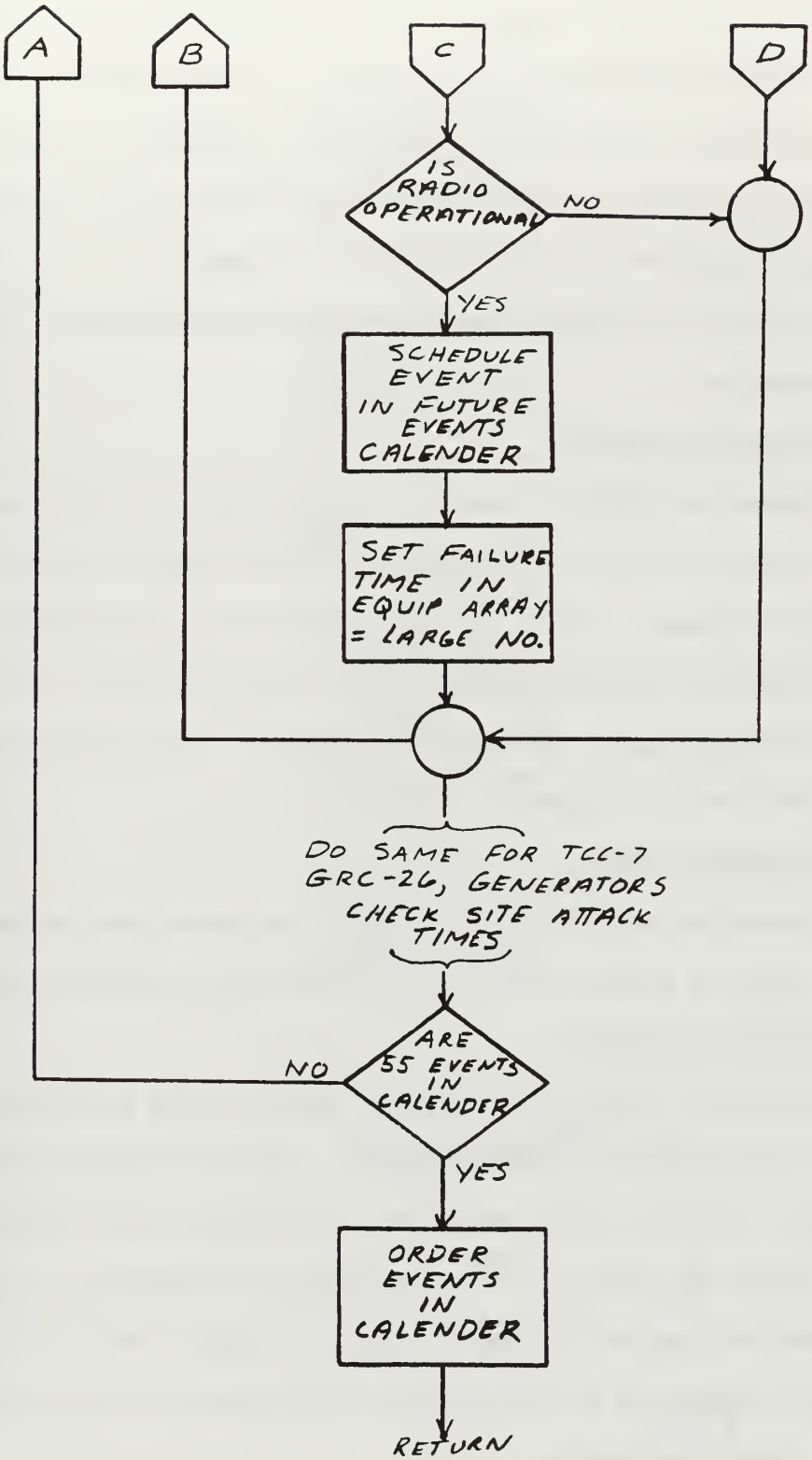
8. Subroutine SEARCH

Subroutine SEARCH (Figure 8) is used to place events in the future events calander by sequentially checking each equipment simulation



Subroutine SEARCH

Figure 8



Subroutine Search (Cont.)

unit subject to failure and each site placing those with the earliest occurrence times in the future events calander. Only equipment units which are operational and connected to a system are considered. The search for future events is stopped when fifty-five are present in the calander. This leaves enough room in the calander for including events caused by player decisions but provides enough to insure that the time of events used is sequential.

9. Subroutine UPDATE

Subroutine UPDATE is used to correct the time until failure of equipment subject to failure and in use but not included as events in the future events calander. After the simulation time is incremented UPDATE searches equipment arrays and subtracts the increment from the time until failure for the equipment. Site attack times not in the future events calander also have the increment subtracted.

10. Subroutine SWITCH

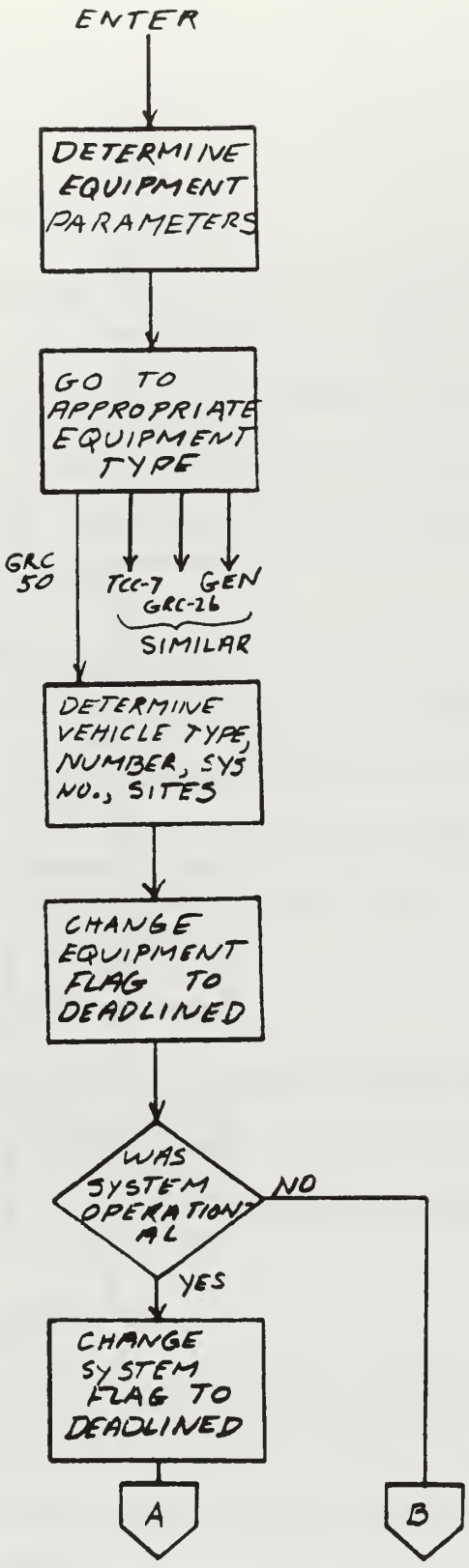
Subroutine SWITCH is used to call the subroutines necessary for processing either a player decision or an internally generated event.

11. Subroutine EQFAIL

Subroutine EQFAIL (Figure 9) is used to cause communications equipment to fail when an equipment failure event is designated as the current event. It also causes equipment failure when site attacks result in damaged equipment. If the equipment is connected to an operational system the system is caused to fail. A repair time is calculated and a repair event using it is scheduled. An estimate of repair time is printed for player information.

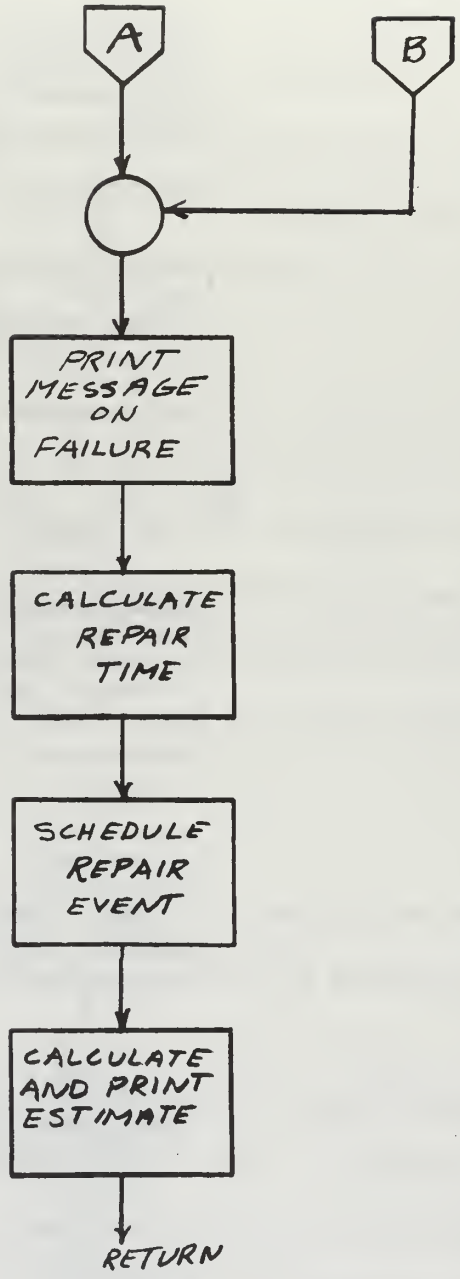
12. Subroutine EQREP

This subroutine is used to repair communication equipment after



Subroutine EQFAIL

Figure 9



Subroutine EQFAIL (Cont.)

a repair event becomes the current event. Although only the AN/GRC-50 radio is illustrated in Figure 10 the repair routine for the AN/TCC-7, AN/GRC-26, and generators is similar.

13. Subroutines OP50, OP7, and OP26

These subroutines are used in conjunction with subroutine EQREP. OP50 determines if the repaired AN/GRC-50 radio will enable the system to which it is connected to resume operation. This will occur only if operational equipment is currently connected wherever else required on the system. OP7 performs a similar function for AN/TCC-7 multiplex units and OP26 for AN/GRC-26 radios.

14. Subroutine VEHBKD

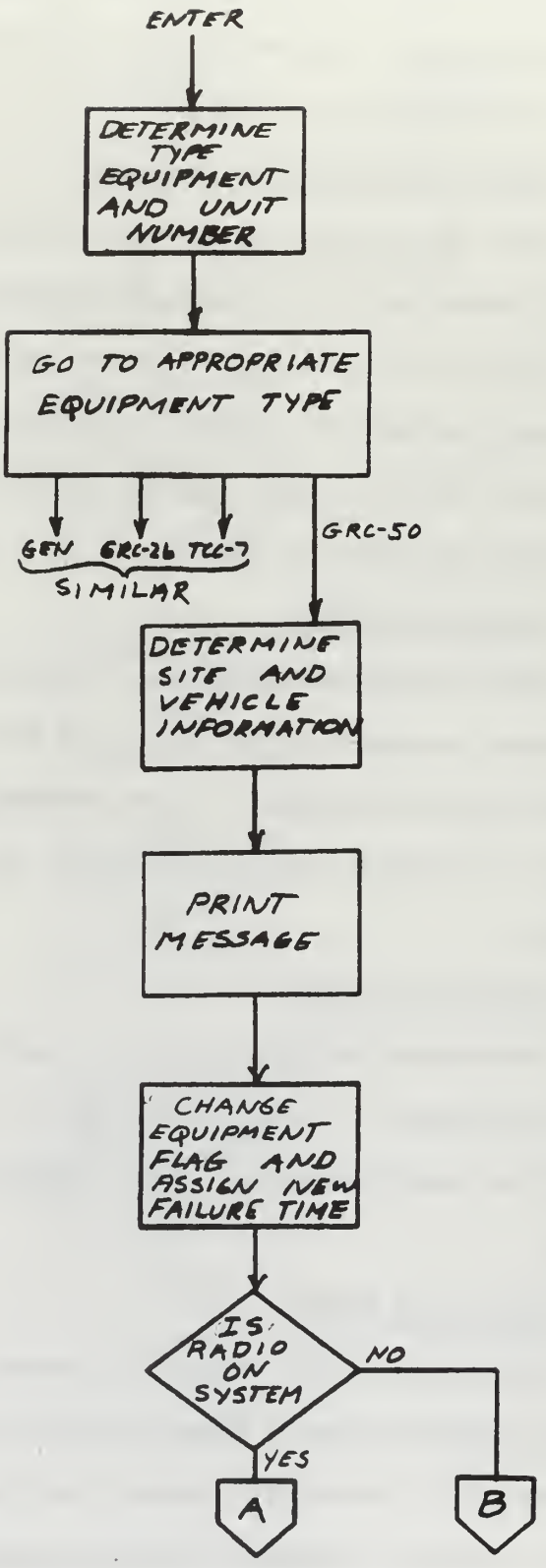
Subroutine VEHBKD (Figure 11) causes the communications vehicles and generators simulated in the program to break down during transit or site attack when the appropriate event becomes the current event. A repair event is scheduled and an estimate of repair time is printed for the players.

15. Subroutine VEHREP

Subroutine VEHREP (Figure 12) repairs vehicles when a repair event is encountered. If the vehicle was in transit to a site when it broke down the remainder of the trip is started and an arrival event is scheduled.

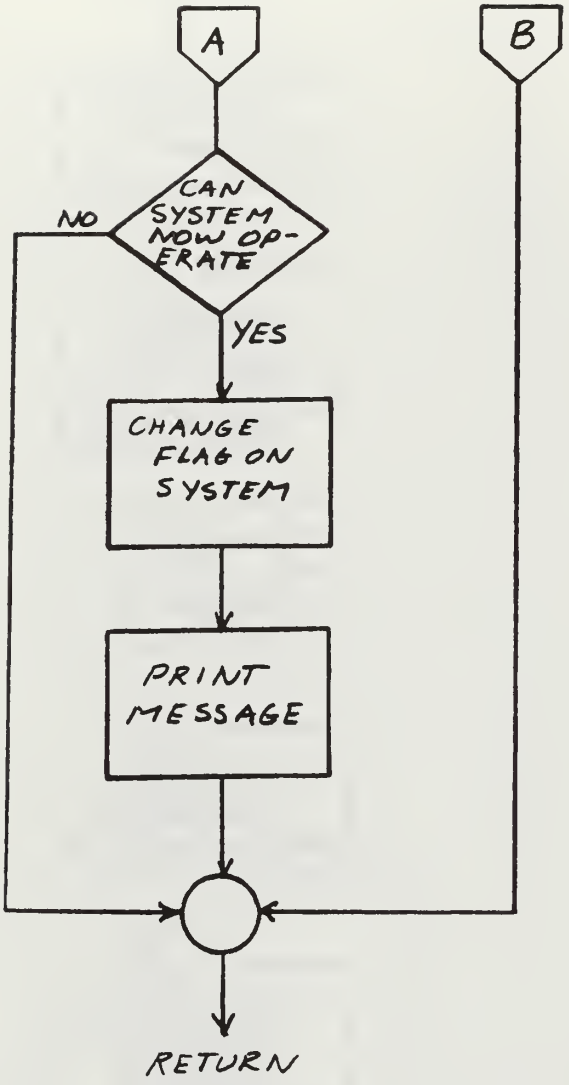
16. Subroutine SITACK

Subroutine SITACK (Figure 13) causes a specific site to be attacked and probabilistically determines which vehicles and equipment are damaged based on a probability assigned for the type of site. If a vehicle is damaged subroutine VEHBKD is called to process it while subroutine EQFAIL is called for equipment damage. The figure illustrates the process

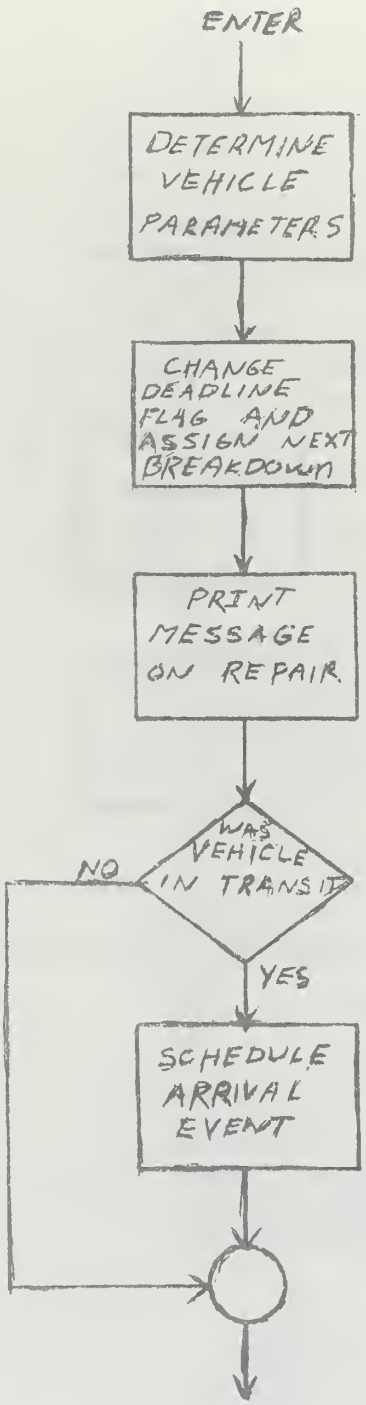


Subroutine EQREP

Figure 10

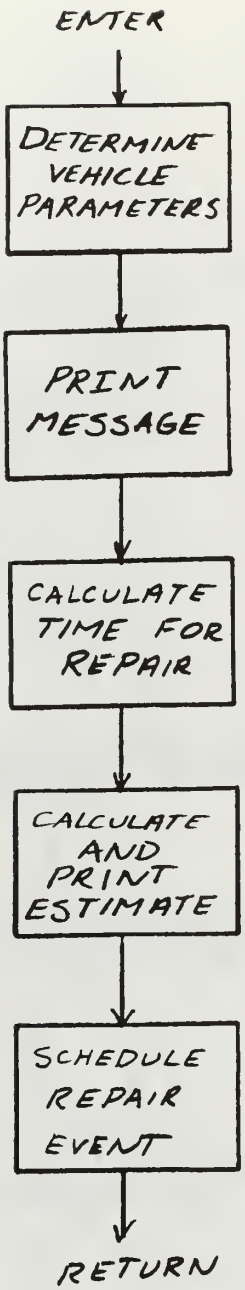


Subroutine EQREP (Cont.)



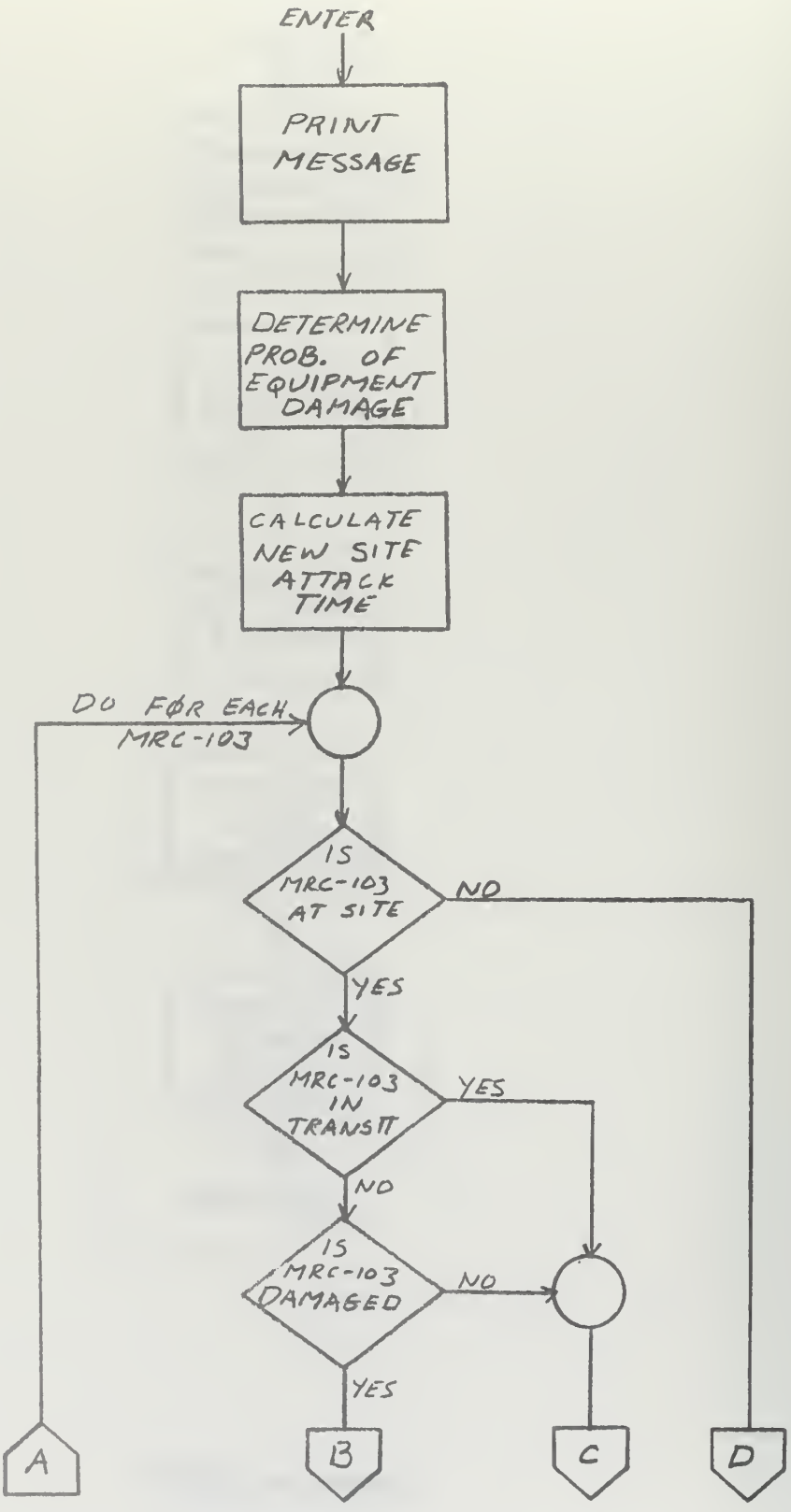
Subroutine VEHBKD

Figure 11



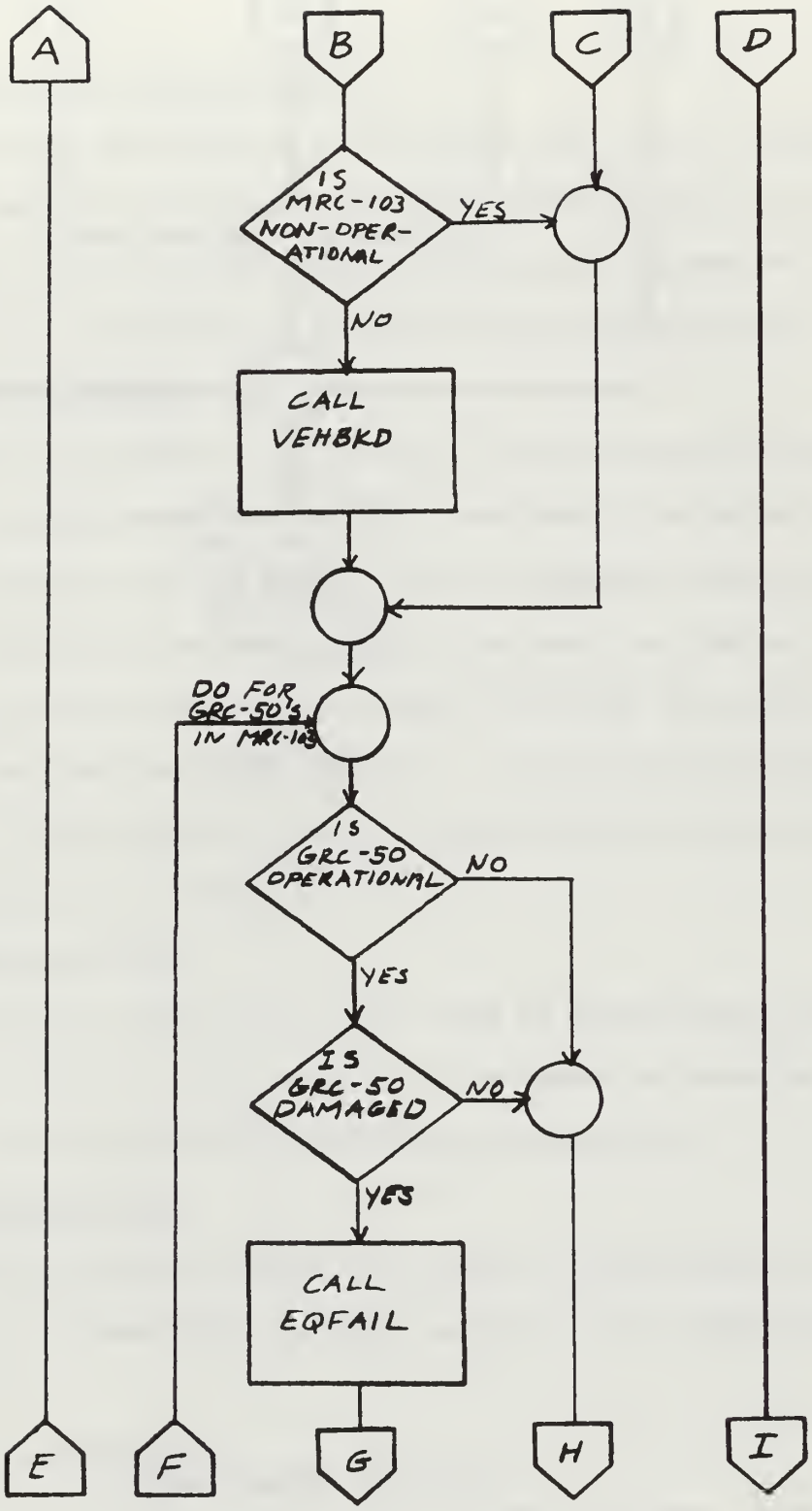
Subroutine VEHREP

Figure 12

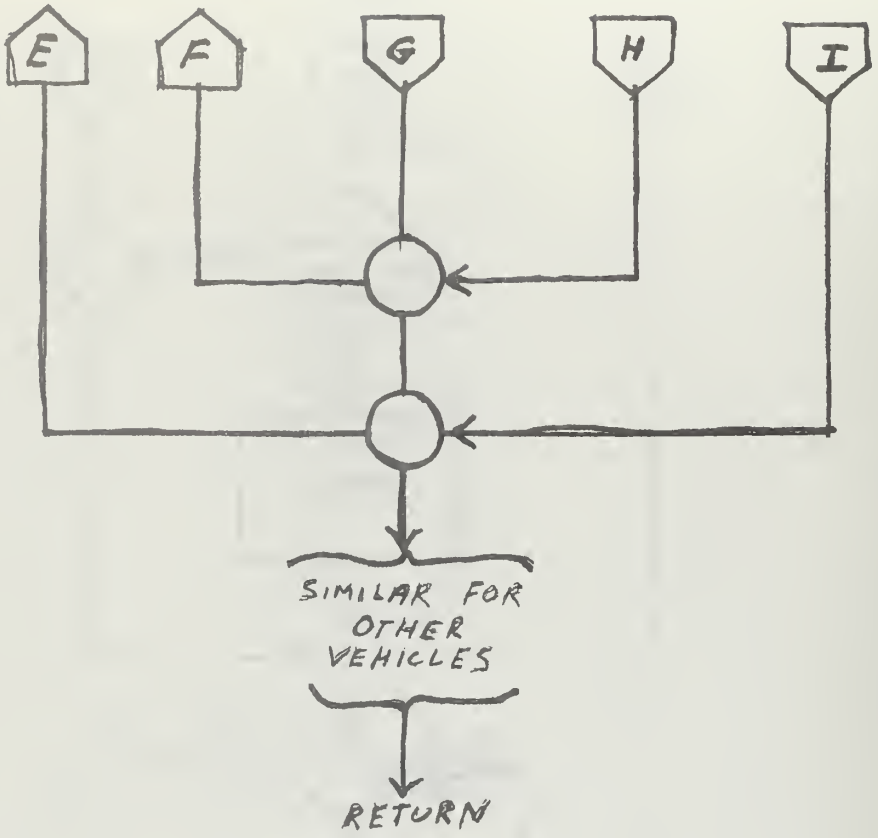


Subroutine SITACK

Figure 13



Subroutine SITACK (Cont.)



Subroutine SITACK (Cont.)

for AN/MRC-103 vehicles only although others are handled in a similar manner.

17. Subroutines EQREM and EQINST

Subroutine EQREM (Figure 14) is called when a player request for equipment removal is received. Subroutine EQINST (Figure 15), on the other hand, is used for connecting communications equipment on systems. For both of these subroutines only AN/GRC-50 radios are illustrated.

18. Subroutine CKEVNT

Subroutine CKEVNT is used to search the future events calander, when a radio or multiplex is repaired, for installation completion events on equipment in use on the same system. This is necessary since the parameters in the simulation unit for a piece of equipment are changed to reflect usage as soon as installation is begun even though the system cannot operate until the installation is complete. If an installation completion event on the same system is found the system cannot become operational with the equipment just repaired.

19. Subroutine SYSREM

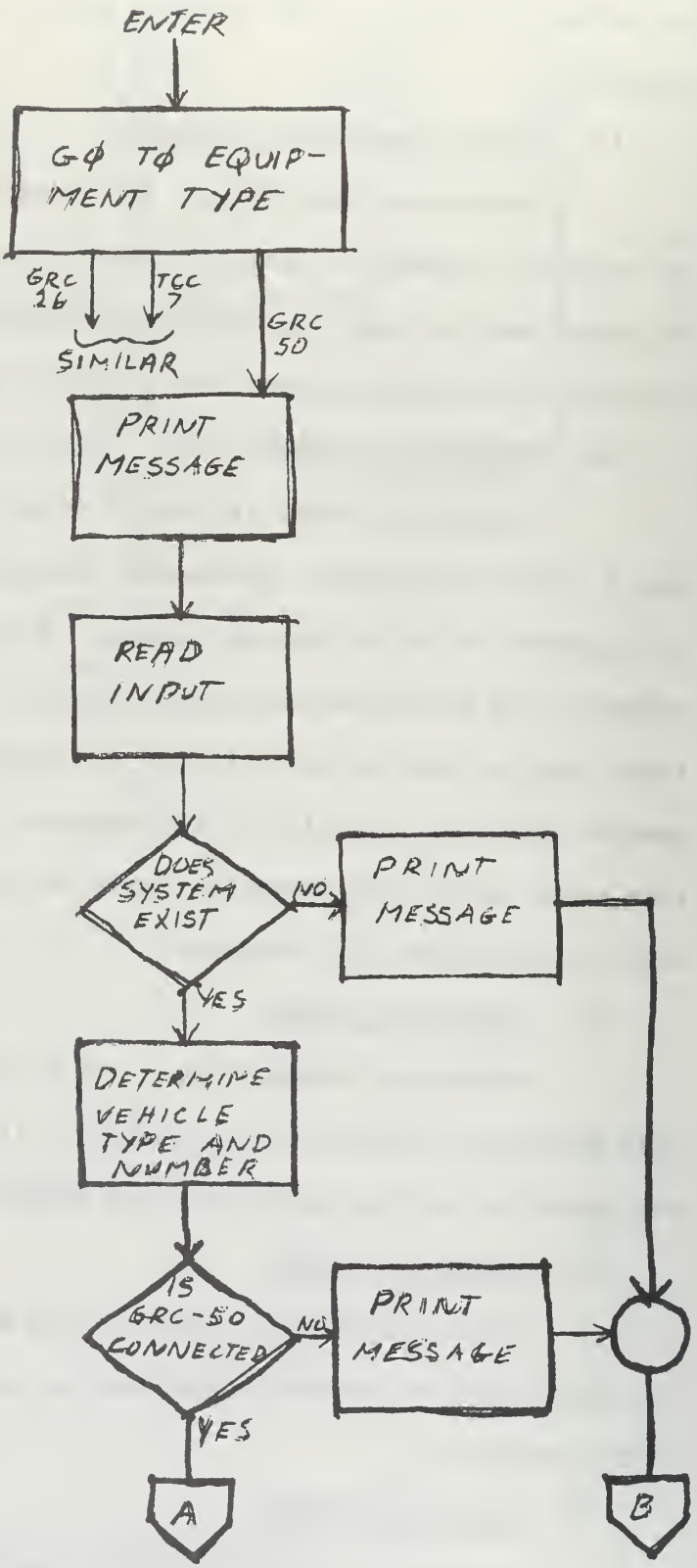
Subroutine SYSREM (Figure 16) is used to delete systems when this decision is entered by the players. If equipment is connected to the system it is disconnected and the players are notified.

20. Subroutine SYINST

Subroutine SYINST (Figure 17) is used for establishing any of the three types of communications systems on entry of the appropriate player decision.

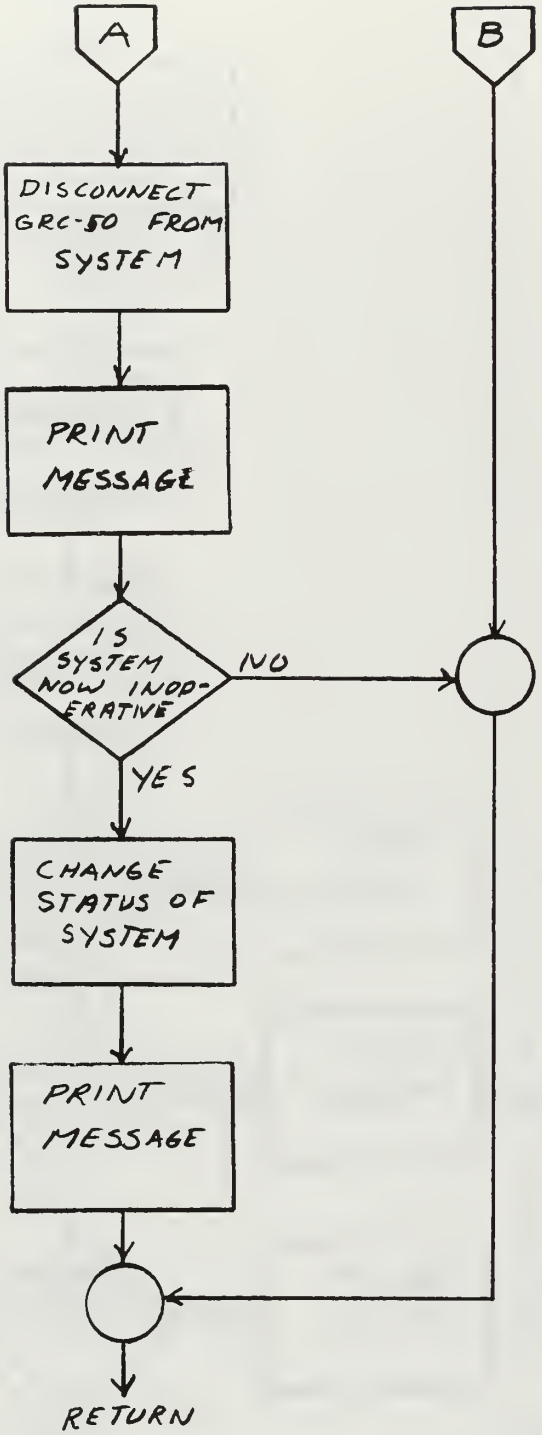
21. Subroutine VEHMOV

Subroutine VEHMOV (Figure 18) serves two functions. First it begins vehicle movement when the decision is received from the players.

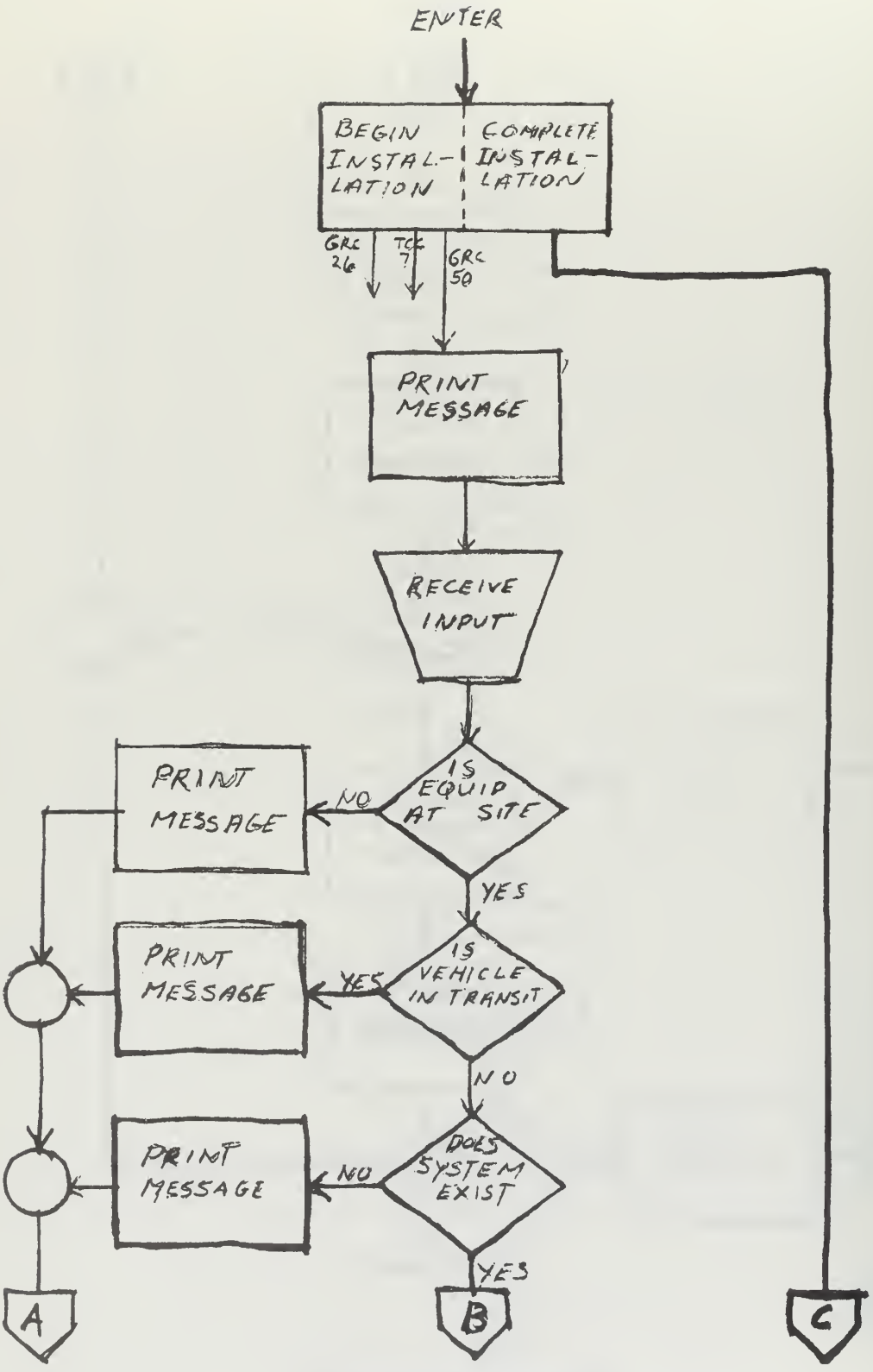


Subroutine EQREM

Figure 14

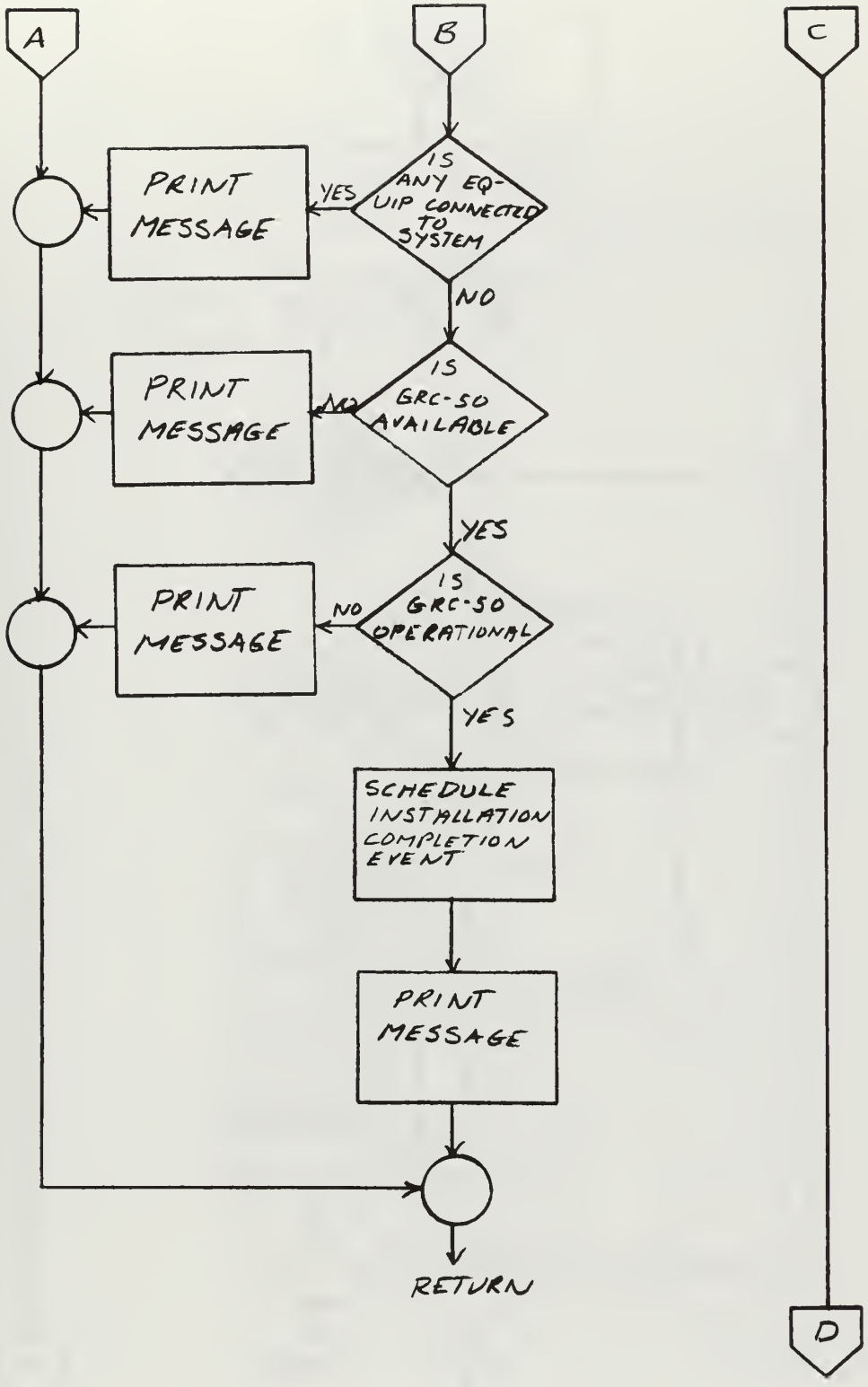


Subroutine EQREM (Cont.)

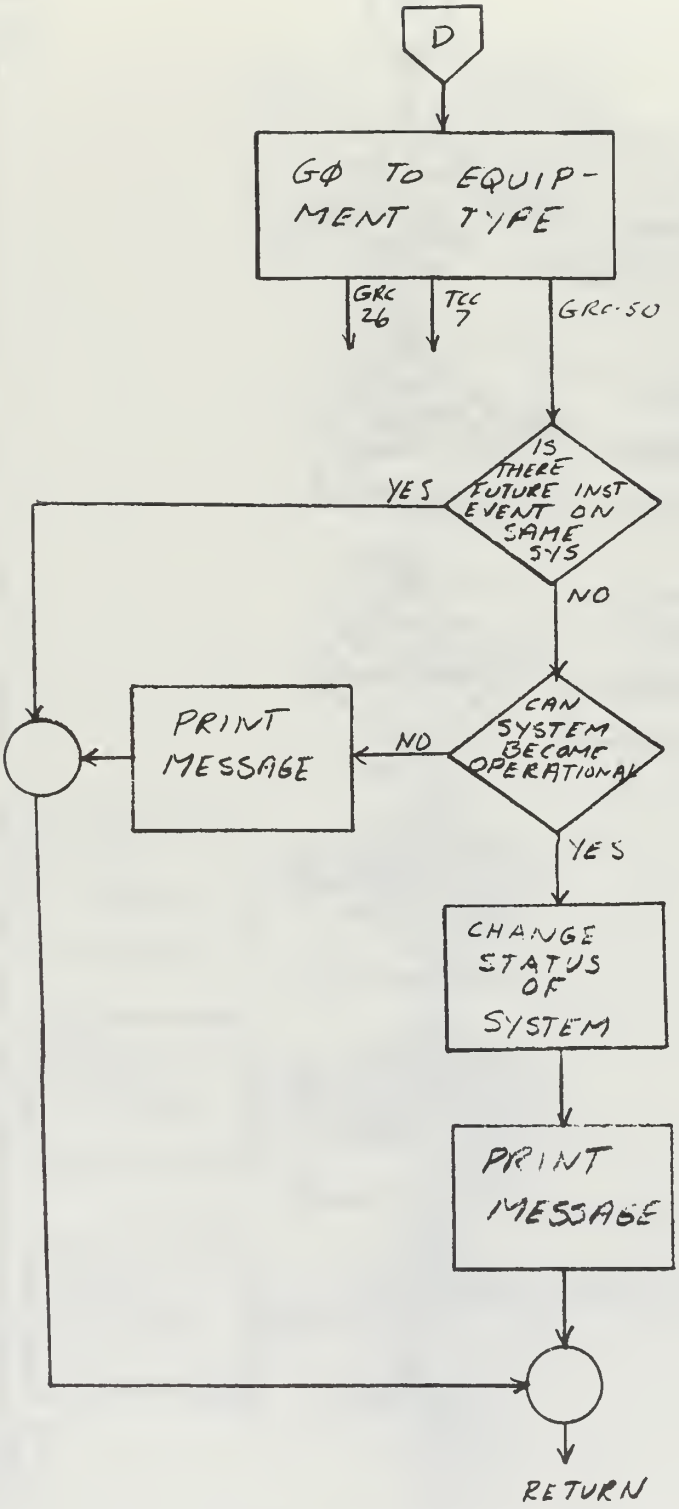


Subroutine EQINST

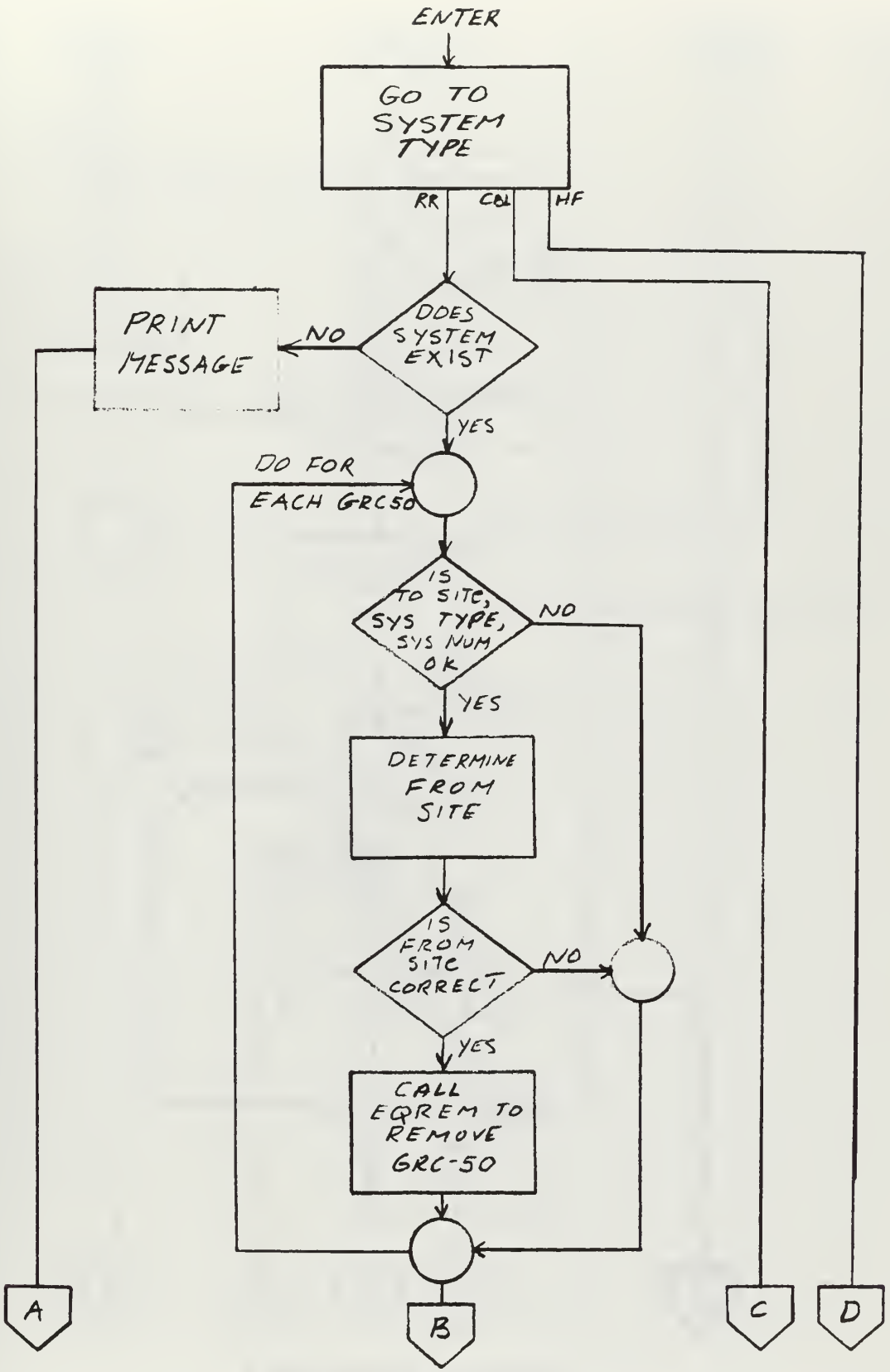
Figure 15



Subroutine EQINST (Cont.)

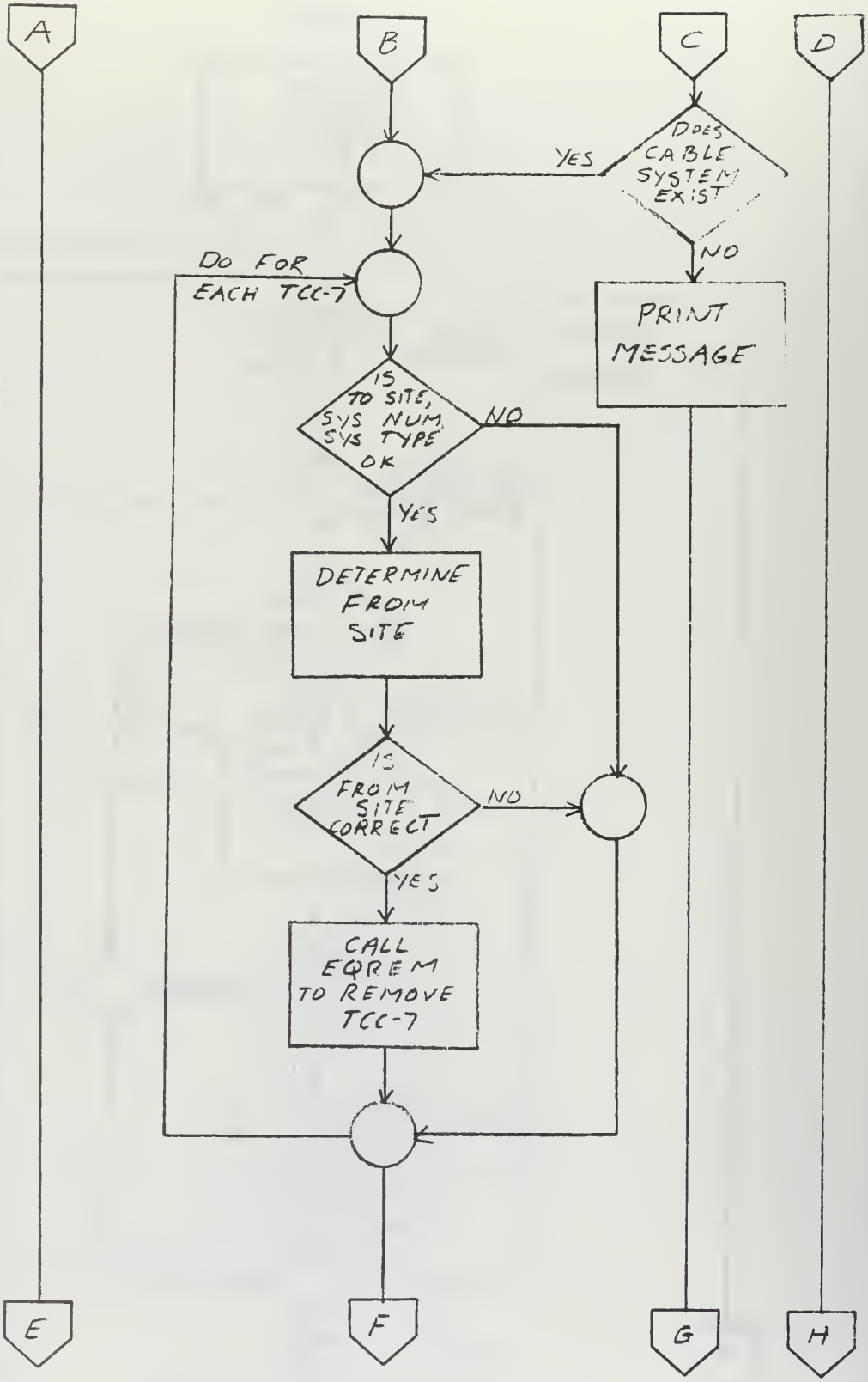


Subroutine EQINST (Cont.)

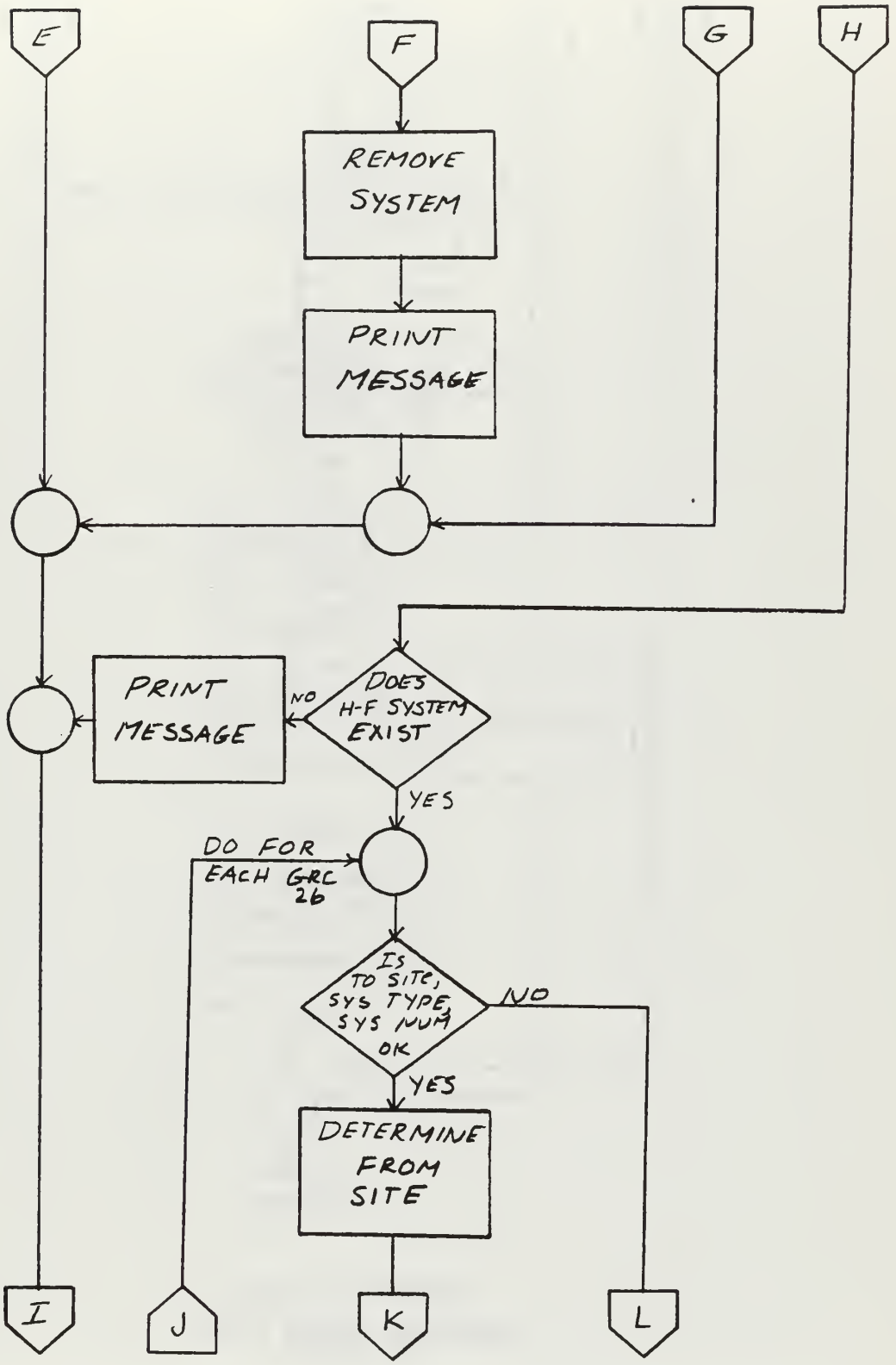


Subroutine SYSREM

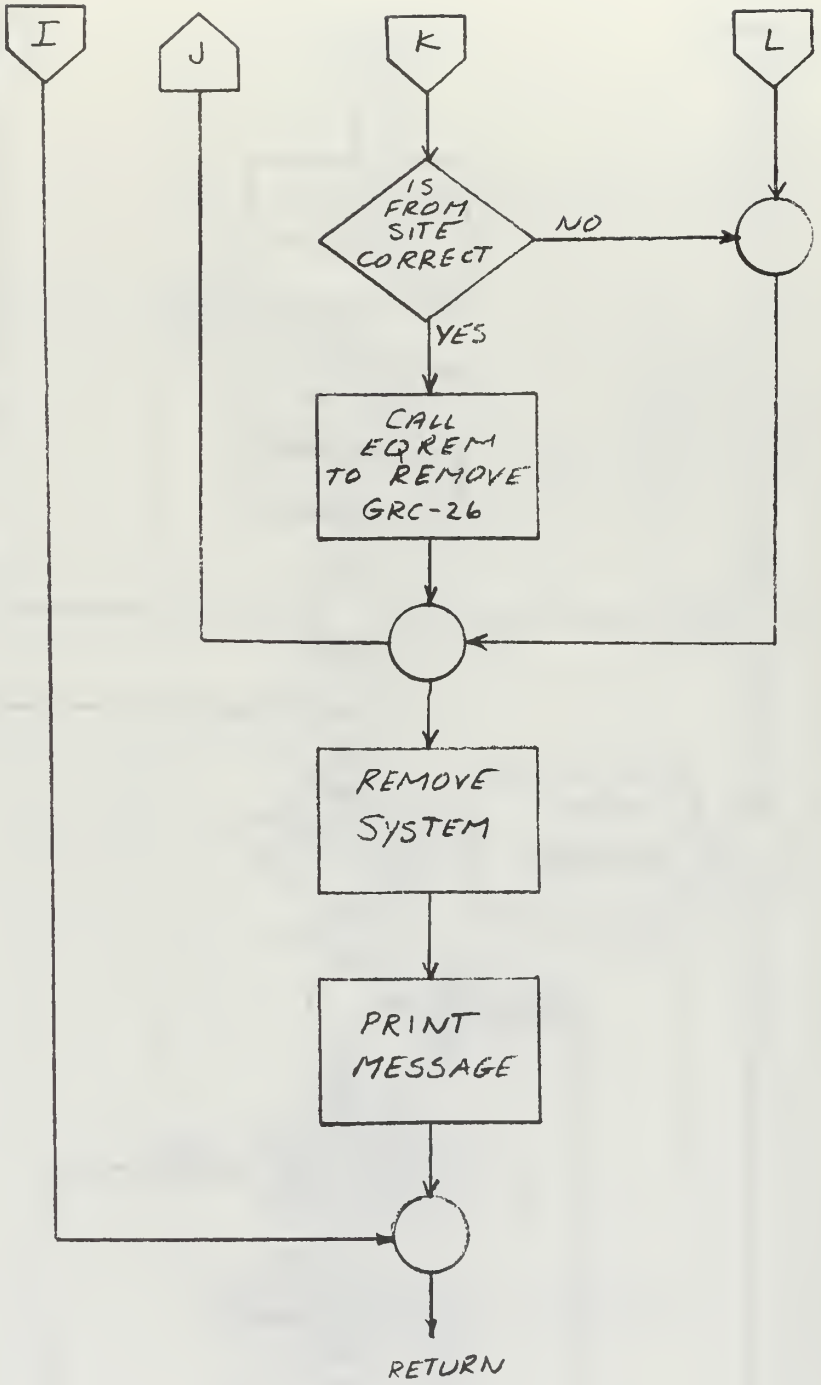
Figure 16



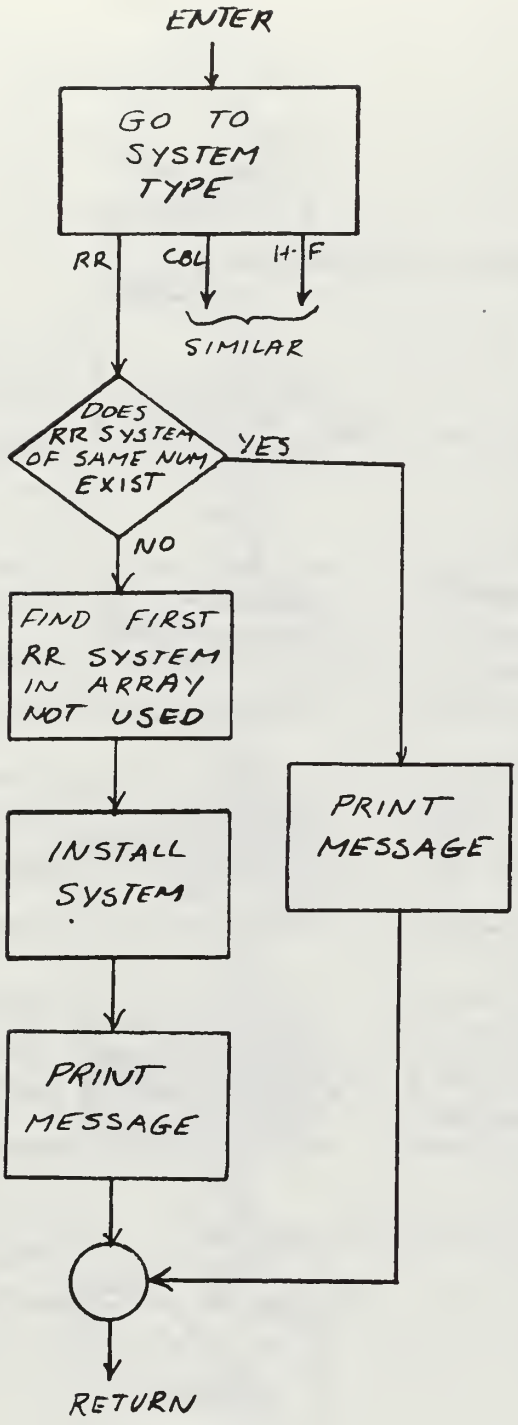
Subroutine SYSREM (Cont.)



Subroutine SYSREM (Cont.)

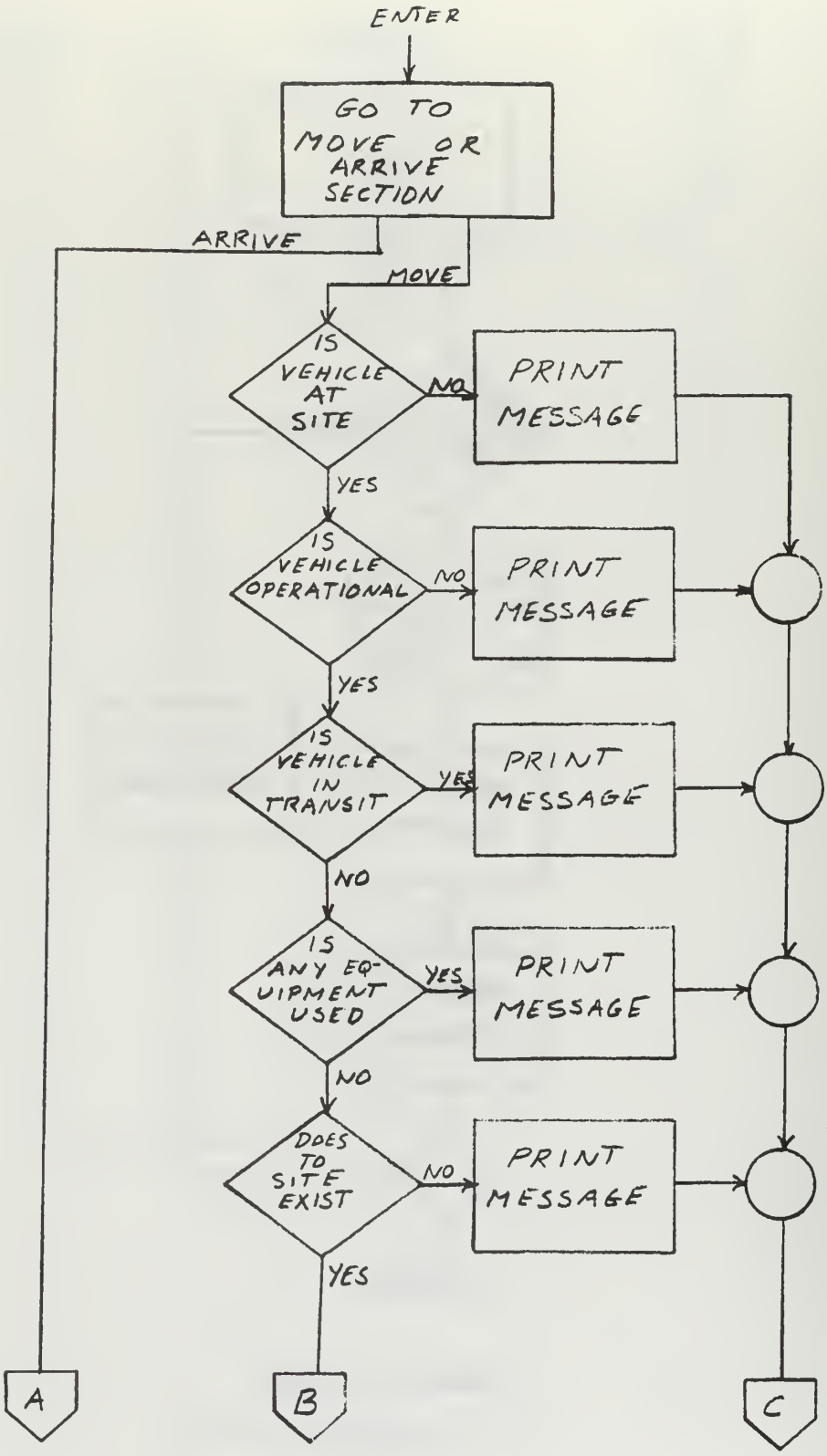


Subroutine SYSREM (Cont.)



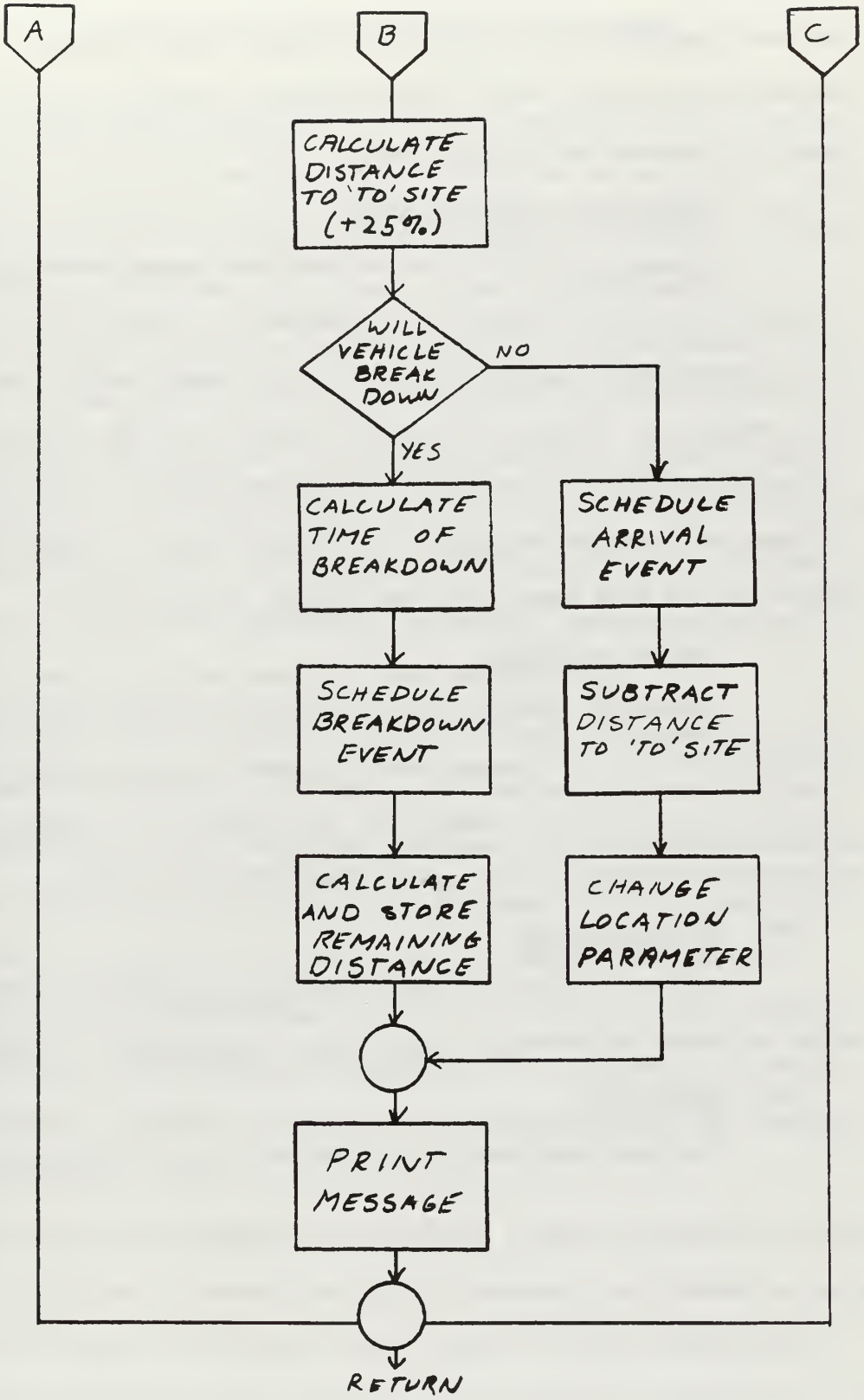
Subroutine SYINST

Figure 17



Subroutine VEHMOV

Figure 18



Subroutine VEHMOV (Cont.)

If the vehicle breaks down enroute a breakdown event is scheduled and the remaining distance to travel is stored. Second it prints a message informing the players when a vehicle arrives and changes the transit parameter in the vehicle simulation unit.

22. Subroutines RANDU and GAUSS

Subroutine RANDU is an IBM supplied random number generator for use on the IBM 360 computer. It employs the power residue method of generating random numbers and has a cycle length much larger than that required by the game. Subroutine GAUSS is an IBM supplied subroutine which generates normally distributed samples adjusted to an input mean and standard deviation. The normal sample is formed from twelve random numbers from randu using the central limit theorem.

23. Subroutine ORDERT

Subroutine ORDERT is used to order the future events calander by time of event. If a single event is added to the calander it is placed initially in position one hundred by the subroutine generating it and subsequently placed in proper order when ORDERT is called.

24. Subroutine TIME

Subroutine TIME is used to convert the simulation play time which is stored in minutes to days, hours, and minutes for player use.

25. BLOCK DATA

The BLOCK DATA section is used for array initialization.

V. ADAPTING THE PROGRAM FOR OTHER APPLICATIONS

Four major types of simulation units are employed in the program: (1) equipment units, (2) vehicle units, (3) system units, and (4) site units. The information stored in arrays associated with each of these units completely describes the current status and deployment of all simulated equipment as well as future actions for each generated by the computer. Equipment units include radios and multiplexers while vehicle units include communications vehicles and generators. System units provide information on the three types of systems and site units do the same for communications sites. By changing the equipment associated with the program units, along with array size and possibly employment rules, the same basic program may be used for other applications.

The easiest conversion, that is the one requiring fewest program changes, would be adapting the program to other signal organizations. Since the Division Signal Battalion, Airborne Division Signal Battalion, Army Area Signal Battalion, Airborne Corps Signal Battalion, and Army Command Radio and Cable Battalion all perform similar missions with similar equipment, major changes in the current program would include only array sizes and assignment proceedures. All program units would still represent equipment or systems performing the functions currently assigned to them.

The program may be modified to simulate a power transmission system, either in peacetime or during conflict, by somewhat more extensive changes. Vehicle units might now represent major items of power generation or transmission equipment while equipment units represent components of these.

Systems could include different transmission methods or routes and sites the location where the generator or transmission equipment is located.

Transportation problems, including motor vehicle, railroad, or air, may also be simulated by appropriate changes. Vehicle units could include not only the carriers themselves but also bridges, underpasses, overpasses, major switches, and airport facilities as appropriate. Equipment units would be components of the vehicle units. Systems would correspond to the routes used and sites the garages, yards, or airports.

VI. SUGGESTED AREAS FOR FURTHER DEVELOPMENT

The two areas which appear the most promising subjects for further development of the program deal with increasing the level of detail and improving the accuracy of the internal parameters used.

Increased detail might prove useful in a number of areas. At present there is no check in the program to insure that radio line-of-sight exists for radio-relay systems. The burden of seeing that it is maintained is left to the instructor who supervises the play. Some preliminary investigation was made toward including this information in a binary matrix by grid location, but an efficient way to determine mutual line-of-sight properties between all points in the corps area of operations must be devised before this approach becomes practical.

In the current program only a defensive phase is included in addition to setup. Although movement of sites corresponding to an attack may be played it is likely, in actual combat, that the level of conflict would increase during an attack. Incorporating a change in the level of conflict would increase the realism of a simulated attack.

The current liklihood of a site being attacked is governed solely by the classification of the site as a relay site, a major terminal, or a minor terminal. Many other factors such as accessibility, proximity to front lines, and security provided will influence the safety of the site and therefore could be included.

A table of play statistics generated at game termination might prove to be a valuable measure of the effectiveness of student play although the stochastic nature of the game prevents any absolute scale from being

used. Useful entries could include number of system failures, mean length of failure, number of vehicle movements, average distance moved, etc.

In the current program vehicles may fail during transit but they cannot be attacked. A more realistic approach might be to include both these factors and also provide a capability for changing the destination of a vehicle in transit.

Improving the accuracy of the internal constants which define the failure, repair, site attack, installation, and transit time distributions would be a whorthwhile, but difficult, task. Little firm data appears to be available in most of these areas and, as a result, much of it was based on a limited sample of military judgement. Even if firm data is not available more accurate parameters could be obtained by a larger sample of military communicators experienced in corps communications.

APPENDIX A

INTRODUCTION TO ARMY CORPS COMMUNICATIONS

A. GENERAL

The purpose of this appendix is to present a quick overview of the communications capabilities of the Corps Signal Battalion for readers not familiar with signal corps organization and operation. The only aspects covered in any reasonable detail are those directly concerned with the construction of the game and readers interested in further explanation should consult references (2), (4), and (7).

Signal communications are provided for corps headquarters through command signal centers established at corps main, corps alternate, and corps tactical (when employed) command posts. Each of these signal centers provides a communications center for processing printed classified messages, telephone switching, teletype terminal facilities, and radio wire integration facilities for interfacing radio and telephone circuits. Facsimilie (image transmission) and teletype tape relay facilities are provided at corps main and corps alternate only. Scheduled messenger, both motor and air, is provided from corps main and alternate to other signal centers, to subordinate division command posts, and to other major subordinate commands of the corps. Special (unscheduled) messenger service is provided at each command signal center. Additional facilities, such as automatic data processing, may be provided if authorized.

Messages transmitted electronically between corps and subordinate unit headquarters are usually transmitted on either multichannel radio-relay systems, multichannel cable systems, or high frequency radio nets.

A short description and some advantages and disadvantages of each is discussed below.

Radio-relay systems are the primary means of communications within a corps and each system is capable of simultaneously transmitting and receiving twelve telephone conversations. A system of this type requires a radio located near each of the headquarters being supported and the radios operate in a frequency range requiring radio line-of-sight between transmitter and receiver (the system cannot operate if the transmitter and receiver have obsticals blocking a straight line path). As a result, relay sites are often required in mountainous or uneven terrain. The distance between radios on this type of system should normally not exceed thirty miles. The advantages of radio-relay systems include high message density capability and relatively short installation times (approx. thirty minutes). Disadvantages include relatively easy interception of messages and the need for isolated relay sites on long or difficult systems.

Multichannel cable systems are capable of simultaineously transmitting and receiving twelve telephone circuits using a four conductor cable between the system end points. The cable may be run overhead or placed directly on the ground and for long systems unattended or attended repeaters may be required. Since distances between headquarters in the corps area of operations are large multichannel cable systems are not frequently used. Advantages of multichannel cable include high message density and security from message interception. Disadvantages are long installation time, the need for attended repeaters on long systems, and susceptability to breakage of the cable by friendly troops.

A high frequency (H-F) radio net established by the Corps Signal Battalion typically contains from three to seven different stations capable of communicating with each other on the same frequency. One voice circuit and one teletype circuit can be transmitted simultaneously and the battalion is capable of installing a number of H-F nets. Advantages of H-F include quick setup times (approx. ten minutes) and no requirement for repeaters. Disadvantages include low message density and ease of interception.

The placement of communications equipment at a supported headquarters usually involves establishing two signal locations. One of these, commonly referred to as radio-relay hill, is located on a high piece of terrain near the supported headquarters and contains those radios requiring line-of-sight and other radios having transmission difficulties. Equipment such as telephone switching, message centers, etc., are usually placed in the supported headquarters compound and connected to radio-relay hill by cable.

Only the communications equipment and vehicles necessary for establishing the three types of communications systems described above were included in the game for placement and failure. This was due both to the time constraint on program construction and the fact that these items constitute the bulk of communications equipment which commonly fail and are frequently moved. Equipment such as telephone exchanges, communications centers, and teletype tape relays are provided only for specific headquarters and little reorganization or moving will occur in combat.

B. COMMUNICATIONS EQUIPMENT NEEDED FOR SYSTEMS

The following section provides a brief description of the vehicles

and equipment necessary to establish the three types of communications systems installed by the Corps Signal Battalion.

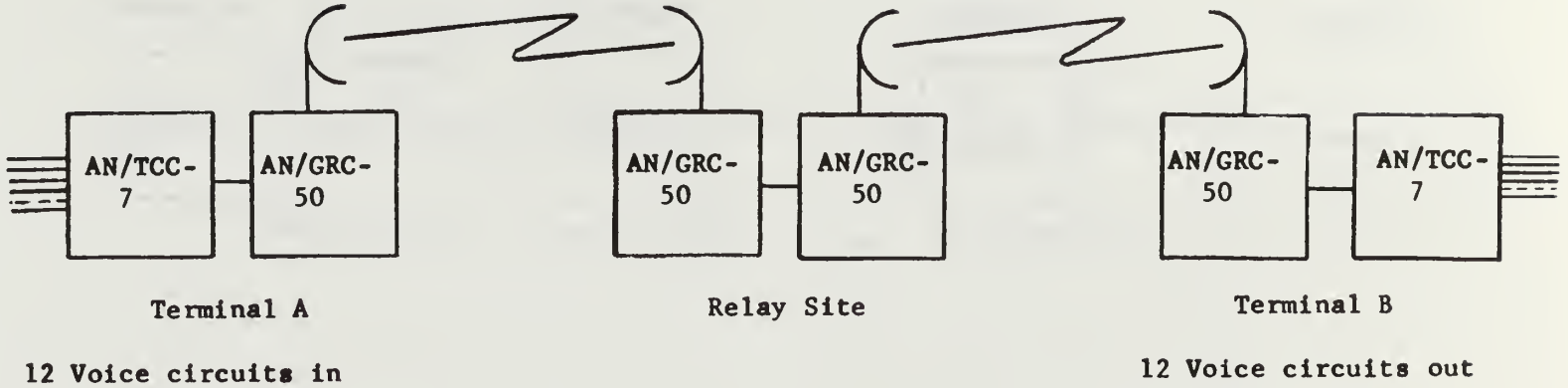
A radio-relay system with no relay sites requires at each terminal one AN/GRC-50 radio and one AN/TCC-7 multiplexer. The purpose of the multiplexer is to combine the twelve voice circuits into a single band for transmission and to separate the voice circuits upon reception. The radio receives the signal to be transmitted from the multiplexer by cable and transmits it to a radio at the other site. The radio at the other site feeds the received signal to its associated multiplexer also by cable. Each radio and multiplexer is capable of receiving and transmitting simultaneously.

Each radio-relay site inserted in a radio-relay system requires two AN/GRC-50 radios - one to operate with adjacent sites on either side. No multiplex equipment is required since it is necessary to have intelligible voice circuits only at the terminals.

A multichannel cable system requires one AN/TCC-7 multiplex unit located at each of the supported headquarters the cable system connects. The purpose of the multiplexer is the same as in radio relay systems. Spiral Four (four conductor) cable is used to connect the multiplexers with AN/TCC-11 (unattended) and AN/TCC-8 (attended) repeaters placed as required at specified intervals along the cable. The program presented in this thesis does not consider placement or failure of repeaters for cable systems.

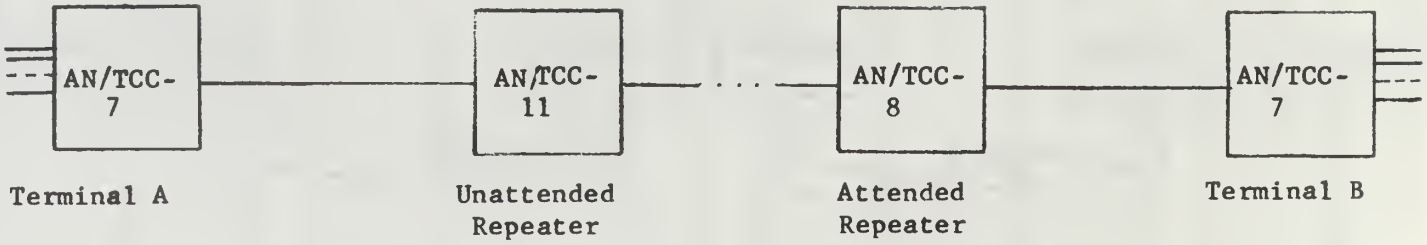
High frequency nets require one AN/GRC-26 radio at each of the headquarters using the net.

Figures 19 through 21 provide an illustration of the type of equipment required for typical systems of each type.



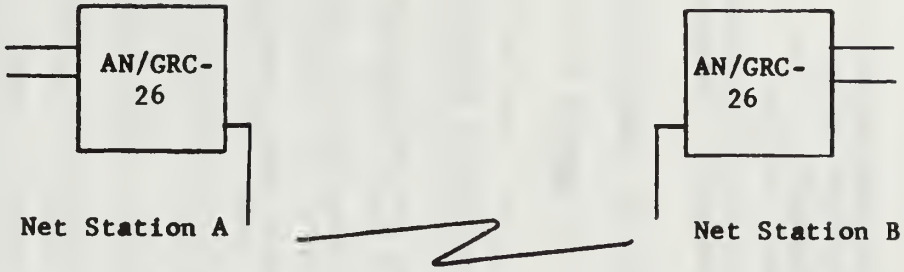
Example of
Radio Relay System

Figure 19



Example of
Multichannel Cable System

Figure 20



Example of
High Frequency System

Figure 21

C. COMMUNICATIONS VEHICLES

Four types of communications vehicles are organic to the Corps Signal Battalion to provide equipment for installation of systems. The vehicles and major equipment contained are listed in Table V below.

Vehicle Name	Number	Description	Equipment
AN/MRC-102	22	Radio Terminal	one AN/TCC-7 two AN/GRC-50
AN/MRC-103	32	Radio Repeater	three AN/GRC-50
AN/MCC-6	17	Telephone Teleg Terminal	two AN/TCC-7
AN/GRC-26	21	Radio Terminal	one AN/GRC-26

*AN/TCC-50 in AN/MCC-6 is considered identical to AN/TCC-7 for game.

MAJOR EQUIPMENT CONTAINED IN COMMUNICATIONS VEHICLES

TABLE V

Although any vehicle combination containing the equipment needed for establishing a system may be used to support any headquarters, special considerations not discussed here usually cause AN/MRC-103's and AN/MCC-6's to be used for radio-relay terminals at corps main, alternate, and artillery headquarters while AN/MRC-102's are used for radio-relay terminals at other headquarters. Model systems interconnection plans, commonly called doctrinal systems, which specify the recommended number and type of systems connecting major headquarters in the corps area have been developed. Details of these systems can be found in Reference (2).

APPENDIX B

TACTICAL SCENARIO FOR GAME

A. GENERAL

The tactical scenario described in this appendix is a condensed version of the scenario used in the Corps Communications Practical Exercise at the Signal Officers Advanced Course. The offensive portion of the scenario has been deleted since only the defensive portion is used for the game. For the complete scenario readers should consult Reference (7).

B. STRATEGIC SITUATION

Aggressor forces initiated general war against the North Atlantic Treaty Organization (NATO) last year during the month of September. The outbreak of the war was preceeded by a period of increasing diplomatic tension, and as a result, the NATO forces were deployed. To secure his southern flank Aggressor respected the neutrality of Austria, Switzerland, and Yugoslavia. The Aggressor gound attack was preceeded by large scale strategic nuclear bombing of cities and military installations in Western Europe and North America, which initially rendered the United States incapable of reinforcing its forces in Europe. The Aggressor armies and air force, employing tactical nuclear weapons on a large scale, rapidly pushed the NATO forces across France west of the Rhine River. The lines of communication across France were nearly destroyed and approximately seventy-five percent of the NATO airfields in Western Europe and North America were rendered inoperable. However, NATO retaliatory operations against the Aggressor homeland and his lines of communication were extremely effective and reinforcement of Aggressor's initial attack was not possible

on a large scale. The land battle in West Germany and at the Rhine defensive line resulted in such losses to both forces that all large scale movement came to a halt during the fall months. During the winter the Rhine defenses held firm and the conditions in the rear of Aggressor forces deteriorated badly as a result of satellite unrest and the destruction of his homeland. During the same period the United States was partially able to rebuild its forces in NATO and a large, but inadequately equipped, French Army was mobilized. The surviving West German forces, constituting a four division corps and supporting forces, became part of this army. Strategic intelligence indicated this spring that, if NATO could take the offensive and linkup with resistance movements in Germany and Czechoslovakia mass uprisings would occur in these and other satellite countries and Aggressor resistance would collapse. By this time the buildup of NATO tactical air forces and the intensive campaign against Aggressor nuclear delivery means had given NATO an offensive capability.

C. GROUND SITUATION

1. NATO Forces

The 30th (US) Army, a part of the Central Army Group, crossed the Rhine River on 3 July. The attack was initiated with numerous nuclear attacks east of the Rhine. By exploiting the effects of these weapons, NATO forces were able to advance rapidly toward the cities of Kassel, Nurnberg, and Munchen. However, Aggressor resistance began to stiffen on 8 August along the entire front. 30th (US) Army was ordered to assume a defensive posture east of the Altmuhl and Wertach Lech Rivers. Preparations are being made to continue the attack on 16 August to seize crossing sites over the Ludwigs Kanal to ensure the rapid advance of NATO forces to border areas where linkup with guerrilla forces will be accomplished.

2. 1st (US) Corps

The 1st (US) Corps, a part of the 30th Army is organized as a four division corps with supporting troops. On 10 August the attacking elements of the corps were ordered to assume a defensive posture along the Wornitz River in order to reorganize and resupply prior to continuing the attack on 16 August. Units average approximately 85 percent strength but, because of equipment shortages, are considered only 75 percent combat effective. There has been a continuing shortage of all supplies, replacement personnel, and equipment. Since the Rhine crossing most replacement of personnel and equipment have come from the cannibalization of battle damaged units. However, 30th Army has indicated that all corps signal units will receive personnel and equipment to fill all existing TOE shortages prior to 16 August.

D. REQUIREMENT

Acting as the 1st (US) Corps Signal Battalion commander and staff you are to locate signal sites, place communications equipment, and install systems in the corps area of operations to support the corps during the defensive phase. Subsequent to initial installation you are to take whatever action necessary to maintain these communications to the best of your ability.

COMPUTER PROGRAM

This section of the thesis provides a listing of the computer assisted game which was developed.

```
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    MAIOC010
C                                                                       MAIOO020
      CALL INPT                                                         MAIOO030
C                                                                       MAIOO040
      CALL ASSIGN                                                       MAIOO050
C                                                                       MAIOO060
      CALL TABLE(0)                                                     MAIOO070
C                                                                       MAIOO080
      CALL GENTAB(0)                                                    MAIOOC90
C                                                                       MAIOO100
C     INITIALIZE DAY AND TIME                                           MAIOC110
      IDAY=1                                                            MAIOC120
      ITIME=0                                                           MAIOC130
C     IF CALENDER OF FUTURE EVENTS DOESNT HAVE 50 EVENTS ADD EVENTS     MAIOO140
    2 IF(IEVCAL(50).NE.0)GO TO 1                                        MAIOC150
      CALL SEARCH                                                       MAIOO160
C     IS NEXT SCHEDULED EVENT LESS THAN 30 MINUTES AWAY                 MAIOC170
    1 IF(JEVCAL(1)-ITIME.LE.30)GO TO 3                                  MAIOO180
C     UPDATE SIMULATION TIME                                            MAIOC190
      ITIME=ITIME+30                                                    MAIOO200
      CALL UPDATE(30)                                                   MAIOO210
      GO TO 4                                                           MAIOC220
C     DESIGNATE NEXT EVENT AS CURRENT EVENT                             MAIOC230
    3 IEVCUR=IEVCAL(1)                                                  MAIOC240
      ISUB=JEVCAL(1)-ITIME                                              MAIOO250
      ITIME=JEVCAL(1)                                                   MAIOC260
C     TOP JUSTIFY FUTURE EVENTS CALENDER                                MAIOC270
      DO 5 I=2,100                                                      MAIOO280
      JEVCAL(I-1)=JEVCAL(I)                                             MAIOC290
    5 IEVCAL(I-1)=IEVCAL(I)                                             MAIOC300
      IEVCAL(100)=0                                                     MAIOC310
      JEVCAL(100)=0                                                     MAIOC320
C     UPDATE SIMULATION TIME                                            MAIOC330
      CALL UPDATE(ISUB)                                                 MAIOC340
C     PERFORM ACTIONS CALLED FOR BY CURRENT EVENT                       MAIOC350
    9 CALL SWITCH                                                       MAIOO360
C     PRINT TIME                                                        MAIOC370
    4 CALL TIME(ITIME,IDAY)                                             MAIOC380
C     ACCEPT STUDENT DECISION                                           MAIOC390
      WRITE(6,6)                                                        MAIOO400
    6 FORMAT(/' ENTER DECISION'/' XXX')                                 MAIOC410
      READ(5,7)IEVCUR                                                   MAIOC420
    7 FORMAT(I3)                                                        MAIOC430
      WRITE(6,8)IEVCUR                                                  MAIOC440
    8 FORMAT(I4//)                                                      MAIOO450
C     IF DECISION REQUIRES ACTION TAKE IT                               MAIOC460
      IF(IEVCUR.EQ.0) GO TO 2                                           MAIOO470
      GO TO 9                                                           MAIOC480
```

```
C                                                                       MAICC49C
      END                                                               MAIOC5CC

      SUBROUTINE INPT                                                   INPCCC1C
C                                                                       INPCCC2C
CC                                                                      INPCCC3C
CC    THIS SUBROUTINE IS USED FOR INITIAL PLACEMENT OF COMMUNICATIONS   INPCCC4C
CC    EQUIPMENT AND INSTALLATION OF RADIO AND CABLE SYSTEMS FOR         INPCCC5C
CC    THE DEFENSE                                                       INPCCC6C
CC                                                                      INPCCC7C
C                                                                       INPCCC8C
      COMMON/C1/LOCSIT (30), IM102 (22),IM103 (32),IMCC6 (17),IV26 (21),INPCCC9C
     1IGRC50(14C),ITCC7(56),IGRC25(21),IRRSYS(50),IHFSYS(20),ICBSYS  (  INPCC1CC
     210),IDUM1 (30),IGEN (54),LOCHC(22)                                INPCC11C
      COMMON/C3/IREAD,IWRITE                                            INPCC12C
      COMMON/C4/IG50FL(140),IT7FL(55),IG26FL(21),IGENFL(54)             INPCC13C
      COMMON/C6/IX                                                      INPCC14C
C                                                                       INPCC15C
CC    ENTER GAMEWORD AND SET LOGICAL UNIT NUMBERS FOR INPUT AND         INPCC16C
CC    OUTPUT DEVICES                                                    INPCC17C
C                                                                       INPCC18C
      WRITE(6,2C0)                                                      INPCC19C
  200 FORMAT(//' INPUT GAMEWORD'/' XX')                                 INPCC2CC
      READ(5,2C1)IREAD,IWRITE                                           INPCC21C
  201 FORMAT(2I1)                                                       INPCC22C
      WRITE(6,2C6)                                                      INPCC23C
  206 FORMAT(/' INPUT CDD RANDOM NUMBER'/' XXXXXXX')                    INPCC24C
      READ(5,2C7)IX                                                     INPCC25C
  207 FORMAT(I7)                                                        INPCC26C
      IF(IREAD.EQ.C)GO TO 210                                           INPCC27C
      WRITE(6,202)                                                      INPCC28C
  202 FORMAT(/' INPUT IS ENTERED BY CARDS')                             INPCC29C
  210 IF(IWRITE.EQ.0)GO TO 211                                          INPCC3CC
      WRITE(6,2C4)                                                      INPCC31C
  204 FORMAT(/' COMPLETE SYSTEM AND GENERATOR TABLES ARE PRINTED BY HIGHINPCC32C
     1 SPEED PRINTER')                                                  INPCC33C
      GO TO 212                                                         INPCC34C
  211 WRITE(6,2C5)                                                      INPCC35C
  205 FORMAT(/' COMPLETE SYSTEM TABLE IS PRINTED AT TERMINAL')          INPCC36C
  212 IN=5                                                              INPCC37C
      IOUT=6                                                            INPCC38C
      IF(IREAD.EQ.1)IN=4                                                INPCC39C
      IF(IREAD.EQ.1)IOUT=7                                              INPCC4CC
C                                                                       INPCC41C
CC                                                                      INPCC42C
      WRITE(IOUT,1)                                                     INPCC43C
C                                                                       INPCC44C
```

```
C      INPUT NUMBER AND LOCATION OF COMMUNICATIONS SITES                    INP00450
C                                                                           INP00460
     1 FORMAT(//3X,'*** GAME INITIALIZATION ***'///6X,'* SITE INFORMATION   INP00470
      1 *'//' NUMBER OF SITES ='/' XX ')                                    INP00480
       READ(IN,2)NSITES                                                     INP00490
     2 FORMAT(I2)                                                           INP00500
       WRITE(IOUT,3)NSITES                                                  INP00510
     3 FORMAT(I3/)                                                          INP00520
C                                                                           INP00530
       DO 10 I=1,NSITES                                                     INP00540
       WRITE(IOUT,4)I                                                       INP00550
     4 FORMAT(/' SITE',I3,' LOCATION'/' XXXXXX ')                           INP00560
       READ(IN,5)LOCSIT (I)                                                 INP00570
     5 FORMAT(I6)                                                           INP00580
    10 WRITE(IOUT,62)LOCSIT (I)                                             INP00590
    62 FORMAT(I7)                                                           INP00600
C                                                                           INP00610
    12 WRITE(IOUT,6)                                                        INP00620
     6 FORMAT(' DO YOU WISH TO CHANGE SITES OR LOCATIONS ? (NO = 0, YES =   INP00630
      1 1)'/' X ')                                                          INP00640
       READ(IN,7)ICH                                                        INP00650
     7 FORMAT(I1)                                                           INP00660
       WRITE(IOUT,7)ICH                                                     INP00670
       IF (ICH.NE.1) GO TO 11                                               INP00680
       WRITE(IOUT,9)                                                        INP00690
     9 FORMAT(/' SITE NUMBER CHANGED ='/' XX ')                             INP00700
       READ(IN,2)II                                                         INP00710
       WRITE(IOUT,3)II                                                      INP00720
       WRITE(IOUT,4)II                                                      INP00730
       READ(IN,5)LOCSIT (II)                                                INP00740
       WRITE(IOUT,62)LOCSIT (II)                                            INP00750
       GO TO 12                                                             INP00760
    11 CONTINUE                                                             INP00770
C                                                                           INP00780
CC     INPUT MULTICHANNEL RADIO RELAY SYSTEMS                               INP00790
C                                                                           INP00800
       IDSYS=1                                                              INP00810
       WRITE(IOUT,61)                                                       INP00820
    61 FORMAT(//3X,'*** MULTICHANNEL RADIO RELAY SYSTEMS ***'//' NUMBER O   INP00830
      1F MULITICHANNEL LINKS ='/' XX ')                                     INP00840
       READ(IN,2)NSYS                                                       INP00850
       WRITE(IOUT,3)NSYS                                                    INP00860
       IF(NSYS.EQ.0) GO TO 23                                               INP00870
       WRITE(IOUT,14)                                                       INP00880
    14 FORMAT(/' NUM, FROM, TO'/' X XX XX')                                 INP00890
       DO 13 I=1,NSYS                                                       INP00900
       READ(IN,15)NUM,IFROM,ITO                                             INP00910
    15 FORMAT(I1,1X,I2,1X,I2)                                               INP00920
```

```
      WRITE(IOUT,63)NUM,IFROM,ITO                                       INPCC930
   63 FORMAT(I2,1X,I2,1X,I2/)                                           INPCC940
   12 IRRSYS (I)=(NUM*10000+IFROM*100+ITO)*10                           INPCC950
C                                                                       INPCC960
CC    ALLOWS FOR CHANGING OF COMMUNICATIONS SYSTEMS                     INPCC970
C                                                                       INPCC980
   26 WRITE(IOUT,16)                                                    INPCC990
   16 FORMAT(/' DO YOU WISH TO CHANGE ANY SYSTEM ? (NO = 0, YES = 1)'/' INP01CCC
     1X ')                                                              INP01C10
      READ(IN,7)ICH                                                     INPC1C20
      WRITE(IOUT,7)ICH                                                  INP01C30
      IF(ICH.EQ.1) GO TO 17                                             INPC1C40
      GO TO (23,24,25),IDSYS                                            INP01C50
   17 WRITE(IOUT,18)                                                    INPC1C60
   18 FORMAT(/' SEQUENCE NUMBER OF SYSTEM (1,2,3,...) ='/' XX ')        INPC1C7C
      READ(IN,2)I                                                       INPC1C8C
      WRITE(5,2)I                                                       INP01C90
      WRITE(IOUT,14)                                                    INPC11CC
      READ(IN,15)NUM,IFROM,ITO                                          INP0111C
      WRITE(IOUT,63)NUM,IFROM,ITO                                       INPC112C
      IDUM=(NUM*10000+IFROM*100+ITO)*10                                 INP01130
      GO TO (19,20,21),IDSYS                                            INP01140
   19 IRRSYS (I)=IDUM                                                   INPC115C
      GO TO 22                                                          INPC116C
   20 IHFSYS (I)=IDUM                                                   INPC117C
      GO TO 22                                                          INPC118C
   21 ICBSYS (I)=IDUM                                                   INPC119C
   22 GO TO 26                                                          INPC12CC
C                                                                       INPC121C
CC    INPUT HIGH FREQUENCY RADIO SYSTEMS                                INP01220
C                                                                       INP01230
   23 IDSYS=2                                                           INPC124C
      WRITE(IOUT,30)                                                    INPC1250
   30 FORMAT(//3X,'*** H-F RADIO SYSTEMS ***'//' NUMBER OF H-F SYSTEMS =INP0126C
     1'/' XX ')                                                         INP0127C
      READ(IN,2)NSYS                                                    INP0128C
      WRITE(IOUT,3)NSYS                                                 INPC129C
      IF(NSYS.EQ.0) GO TO 24                                            INPC13CC
      WRITE(IOUT,14)                                                    INPC1310
      DO 27 J=1,NSYS                                                    INPC1320
      READ(IN,15)NUM,IFROM,ITO                                          INPC133C
      WRITE(IOUT,63)NUM,IFROM,ITO                                       INPC1340
   27 IHFSYS (J)=(NUM*10000+IFROM*100+ITO)*10                           INPC135C
      GO TO 26                                                          INPC136C
C                                                                       INPC137C
CC    INPUT MULTICHANNEL CABLE SYSTEMS                                  INPC138C
C                                                                       INPC139C
   24 IDSYS=3                                                           INPC14CC
```

```
      WRITE(IOUT,28)                                                    INP01410
   28 FORMAT(//3X,'***SPIRAL-4 CABLE SYSTEMS ***'//' NUMBER OF CABLE SYSINP01420
     1EMS ='/' XX ')                                                    INP01430
      READ(IN,2)NSYS                                                    INP01440
      WRITE(IOUT,3)NSYS                                                 INP01450
      IF(NSYS.EQ.0) GO TO 25                                            INP01460
      WRITE(IOUT,14)                                                    INP01470
      DO 29 K=1,NSYS                                                    INP01480
      READ(IN,15)NUM,IFROM,ITO                                          INP01490
      WRITE(IOUT,63)NUM,IFROM,ITO                                       INP01500
   29 ICBSYS (K)=(NUM*10000+IFROM*100+ITO)*10                           INP01510
      GO TO 26                                                          INP01520
C                                                                       INP01530
   25 CONTINUE                                                          INP01540
C                                                                       INP01550
CCC   INPUT LOCATIONS OF COMMUNICATIONS VEHICLES AND GENERATORS         INP01560
C                                                                       INP01570
      DO 50 IDVEH=1,5                                                   INP01580
      L=0                                                               INP01590
      GO TO (51,52,53,54,58),IDVEH                                      INP01600
   52 WRITE(IOUT,55)                                                    INP01610
   55 FORMAT(//3X,'*** MRC-103 ***'//' NUMBER OF SITES AT WHICH MRC-103'INP01620
     1'S ARE LOCATED ='/' XX ')                                         INP01630
      GO TO 48                                                          INP01640
   53 WRITE(IOUT,56)                                                    INP01650
   56 FORMAT(//3X,'*** MCC-6 ***'//' NUMBER OF SITES AT WHICH MCC-6''S AINP01660
     1RE LOCATED ='/' XX ')                                             INP01670
      GO TO 48                                                          INP01680
   54 WRITE(IOUT,57)                                                    INP01690
   57 FORMAT(//3X,'*** AN/GRC-26 ***'//' NUMBER OF SITES AT WHICH AN/GRCINP01700
     1-26''S ARE LOCATED ='/' XX ')                                     INP01710
      GO TO 48                                                          INP01720
   58 WRITE(IOUT,59)                                                    INP01730
   59 FORMAT(//3X,'*** GENERATORS ***'//' NUMBER OF SITES AT WHICH GENERINP01740
     1ATORS ARE LOCATED ='/' XX ')                                      INP01750
      GO TO 48                                                          INP01760
   51 WRITE(IOUT,31)                                                    INP01770
   31 FORMAT(//3X,'*** MRC-102 ***'//' NUMBER OF SITES AT WHICH MRC-102'INP01780
     1'S ARE LOCATED ='/' XX ')                                         INP01790
   48 READ(IN,2)N                                                       INP01800
      WRITE(IOUT,3)N                                                    INP01810
      IF(N.EQ.0) GO TO 50                                               INP01820
      DO 65 I=1,30                                                      INP01830
   65 IDUM1(I)=0                                                        INP01840
      WRITE(IOUT,33)                                                    INP01850
   33 FORMAT(/' SITE, NUM'/' XX XX')                                    INP01860
      DO 32 LL=1,N                                                      INP01870
      READ(IN,34)II,IDUM1(II)                                           INP01880
```

```
   34 FORMAT(I2,1X,I2)                                                  INPC189C
   64 FORMAT(I3,1X,I2/)                                                 INPC190C
   32 WRITE(IOUT,64)II,IDUM1(II)                                        INPC191C
      ALLOWS FOR CHANGING LOCATION OF VEHICLES AND GENERATORS           INPC192C
C                                                                       INPC193C
C                                                                       INPC194C
   41 WRITE(IOUT,35)                                                    INPC195C
   35 FORMAT(/' DO YOU WISH TO CHANGE ANY SITE/VEHICLE COMBINATIONS ? (N INPC196C
     1O =C, YES = 1)'/' X ')                                            INPC197C
      READ(IN,7)ICH                                                     INPC198C
      WRITE(IOUT,7)ICH                                                  INPC199C
      IF(ICH.EQ.C)GO TO 40                                              INPC2CCC
      WRITE(IOUT,33)                                                    INPC201C
      READ(IN,34)II,IDUM1(II)                                           INPC202C
      WRITE(IOUT,64)II,IDUM1(II)                                        INPC203C
      GO TO 41                                                          INPC204C
C                                                                       INPC205C
C     ASSIGNS COMMUNICATIONS VEHICLES AND GENERATORS BY ITEM NUMBER     INPC206C
C     TO THE SITES                                                      INPC207C
C                                                                       INPC208C
   40 DO 42 J=1,30                                                      INPC209C
      IF(IDUM1(J).EQ.0)GO TO 42                                         INPC210C
      KK=IDUM1(J)                                                       INPC211C
      DO 43 K=1,KK                                                      INPC212C
      L=L+1                                                             INPC213C
      GO TO (44,45,46,47,50),IDVEH                                      INPC214C
   44 IM1C2(L)=100*J                                                    INPC215C
      GO TO 43                                                          INPC216C
   45 IM103(L)=100*J                                                    INPC217C
      GO TO 43                                                          INPC218C
   46 IMCC6(L)=100*J                                                    INPC219C
      GO TO 43                                                          INPC220C
   47 IV26(L)=1CC*J                                                     INPC221C
      GO TO 43                                                          INPC222C
   6C IGEN(L)=1CC*J                                                     INPC223C
   43 CONTINUE                                                          INPC224C
   42 CONTINUE                                                          INPC225C
   5C CONTINUE                                                          INPC226C
C                                                                       INPC227C
C     ASSIGN INITIAL FAILURE TIMES TO COMMUNICATIONS VEHICLES AND       INPC228C
C     EQUIPMENT                                                         INPC229C
C                                                                       INPC23CC
      CALL INFAIL(5760.,8300000.,0.,11520.,21600.,1,IGENEL,54)          INPC231C
      CALL INFAIL(5760.,8300000.,0.,11520.,21600.,1,IG50EL,140)         INPC232C
      CALL INFAIL(5760.,8300000.,0.,11520.,21600.,1,IT7EL,56)           INPC233C
      CALL INFAIL(5760.,8300000.,0.,11520.,21600.,1,IG26EL,21)          INPC234C
      CALL INFAIL(200.,10000.,0.,400.,750.,10000,IM102,22)              INPC235C
      CALL INFAIL(200.,10000.,0.,400.,750.,10000,IM103,32)              INPC236C
```

```
      CALL  INFAIL(200.,10000.,0.,400.,750.,10000,IMCC6,17)                 INP02370
      CALL  INFAIL(200.,10000.,0.,400.,750.,10000,IV26,21)                  INP02380
      CALL  INFAIL(200.,10000.,0.,400.,750.,10000,IGEN,54)                  INP02390
C                                                                           INP02400
C                                                                           INP02410
      RETURN                                                                INP02420
      END                                                                   INP02430

      SUBROUTINE ASSIGN                                                     ASSCC01C
C                                                                           ASSCC020
CCC   THIS SUBROUTINE ASSIGNS RADIOS AND MULTIPLEX EQUIPMENT TO             ASSCCC30
CCC   VEHICLES AND SYSTEMS                                                  ASSCCC40
CCC                                                                         ASSOC050
CCC                                                                         ASSCCC60
CCC   ASSIGN RADIO AND MULTIPLEX EQUIPMENT                                  ASSOC070
CCC                                                                         ASSOC080
C                                                                           ASSOC090
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),          ASSOC100
     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),    ASSOC110
     1IDUM1(30),IGEN(54),LOCHQ(22)                                          ASSOC120
      COMMON/C4/IG50FL(140),IT7FL(56),IG26FL(21),IGENFL(54),ISITFL(30)      ASSOC130
      COMMON/C6/IX                                                          ASSOC140
      DIMENSION ISITE(2)                                                    ASSOC150
C                                                                           ASSOC160
CCC   ASSIGN AN/GRC-50'S TO AN/MRC-102'S                                    ASSOC170
C                                                                           ASSOC180
      K=0                                                                   ASSOC190
      DO 200 I=1,22                                                         ASSOC200
      DO 200 J=1,2                                                          ASSOC210
      K=K+1                                                                 ASSOC220
  200 IGRC50(K)=(100+I)*100000                                              ASSOC230
C                                                                           ASSOC240
CCC   ASSIGN AN/GRC-50'S TO AN/MRC-103'S                                    ASSOC250
C                                                                           ASSOC260
      DO 201 I=1,32                                                         ASSOC270
      DO 201 J=1,3                                                          ASSOC280
      K=K+1                                                                 ASSOC290
  201 IGRC50(K)=(200+I)*100000                                              ASSOC300
C                                                                           ASSOC310
CCC   ASSIGN AN/TCC-7'S TO AN/MRC-102'S                                     ASSOC320
C                                                                           ASSOC330
      DO 202 I=1,22                                                         ASSOC340
      KK=I                                                                  ASSOC350
  202 ITCC7(I)=(100+I)*100000                                               ASSOC360
C                                                                           ASSOC370
C     ASSIGN AN/TCC-7'S TO AN/MCC-6'S                                       ASSOC380
                                                                            ASSOC390
```

```
C                                                                       ASSOC4CC
      DO 203 I=1,17                                                     ASSOC41C
      DO 203 J=1,2                                                      ASSOC42C
      KK=KK+1                                                           ASSOC43C
  203 ITCC7(KK)=(300+I)*100000                                          ASSOC44C
C                                                                       ASSOC45C
C     ASSIGN AN/GRC-26 RADICS TO AN/GRC-26 VEHICLES                     ASSOC46C
C                                                                       ASSOC47C
      DO 204 I=1,21                                                     ASSOC48C
  204 IGRC26(I)=(400+I)*100000                                          ASSOC49C
C                                                                       ASSOC5CC
C*****************************************************************    ASSOC51C
C                                                                       ASSOC52C
C                                                                       ASSOC53C
C     ASSIGN MULTIPLEX EQUIPMENT TO CABLE SYSTEMS                       ASSOC54C
C                                                                       ASSOC55C
      DO 100 I=1,10                                                     ASSOC56C
      IF(ICBSYS(I).EQ.0) GO TO 100                                      ASSOC57C
C     DETERMINE FROM AND TO SITES OF SYSTEM                             ASSOC58C
      IFROM=(ICBSYS(I)-(ICBSYS(I)/100000)*100000)/1000                  ASSOC59C
      ITO=(ICBSYS(I)-(ICBSYS(I)/1000)*1000)/10                          ASSOC6CC
      NSTM=ICBSYS(I)/100000                                             ASSOC61C
C     DO FOR FROM AND TO SITES                                          ASSOC62C
      DO 101 J=1,2                                                      ASSOC63C
C     DO FOR EACH MULTIPLEX IN MCC-6                                    ASSOC64C
      DO 102 K=23,56                                                    ASSOC65C
C     IS TCC-7 IN USE?                                                  ASSOC66C
      IF((ITCC7(K)-(ITCC7(K)/100000)*100000)/100.NE.0) GO TO 102        ASSOC67C
      NUMVEH=(K-23)/2+1                                                 ASSOC68C
C     FIND SITE WHERE UNUSED TCC-7 IS LOCATED                           ASSOC69C
      NSITE=(IMCC6(NUMVEH)-(IMCC6(NUMVEH)/10000)*10000)/100             ASSOC7CC
C     IF UNUSED RADIO IS AT FROM OR TO SITE ASSIGN IT TO SYSTEM         ASSOC71C
      IF(J.EQ.2) GO TO 103                                              ASSOC72C
      IF(NSITE.NE.IFROM) GO TO 102                                      ASSOC73C
      ITCC7(K)=ITCC7(K)+ITO*100+NSTM*10000+1                            ASSOC74C
      GO TO 101                                                         ASSOC75C
  103 IF(NSITE.NE.ITO) GO TO 102                                        ASSOC76C
      ITCC7(K)=ITCC7(K)+IFROM*100+NSTM*10000+1                          ASSOC77C
      GO TO 101                                                         ASSOC78C
  102 CONTINUE                                                          ASSOC79C
C     SEARCH FOR TCC-7 IN MRC-102                                       ASSOC8CC
      DO 104 L=1,22                                                     ASSOC81C
C     IS TCC-7 IN USE?                                                  ASSOC82C
      IF((ITCC7(L)-(ITCC7(L)/10000)*10000)/10.NE.0)GO TO 104            ASSOC83C
C     FIND SITE WHERE UNUSED TCC-7 IS LOCATED                           ASSOC84C
      NSITE=(IM102(L)-(IM102(L)/10000)*10000)/100                       ASSOC85C
C     IF RADIO IS AT FROM OR TO SITE ASSIGN IT TO SYSTEM                ASSOC86C
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      IF(J.EQ.2) GO TO 107                                              ASSOC880
      IF(NSITE.NE.IFROM) GO TO 104                                      ASSOC890
      ITCC7(L)=ITCC7(L)+ITO*100+NSTM*10000+1                            ASSOC900
      GO TO 101                                                         ASSOC910
  107 IF(NSITE.NE.ITO) GO TO 104                                        ASSOC920
      ITCC7(L)=ITCC7(L)+IFROM*100+NSTM*10000+1                          ASSOC930
      GO TO 101                                                         ASSOC940
  104 CONTINUE                                                          ASSOC950
C                                                                       ASSOC960
C     WRITE ERROR MESSAGE IF SPARE TCC-7 CANNOT BE LOCATED              ASSOC970
C                                                                       ASSOC980
      IF(J.EQ.1) WRITE(6,105)IFROM                                      ASSOC990
      IF(J.EQ.2) WRITE(6,105)ITO                                        ASS01000
  105 FORMAT(/' INSUFFICIENT AN/TCC-7''S AT SITE',I3/)                  ASS01010
C                                                                       ASS01020
  101 CONTINUE                                                          ASS01030
  100 CONTINUE                                                          ASS01040
C                                                                       ASS01050
C*****************************************************************    ASS01060
C                                                                       ASS01070
C     DETERMINE WHICH HEADQUARTERS RADIO SITES ARE SUPPORTING           ASS01080
C                                                                       ASS01090
      DO 300 I=1,30                                                     ASS01100
      IF(LOCSIT(I).EQ.0) GO TO 300                                      ASS01110
C     CHECK EACH HEADQUARTERS                                           ASS01120
      DO 301 J=1,22                                                     ASS01130
C     FIND DISTANCE FROM SITE TO HEADQUARTERS                           ASS01140
      DISTSQ=((LOCSIT(I)/1000-LOCHQ(J)/1000)**2)+(((LOCSIT(I)-(LOCSIT(I)ASS01150
     1/1000)*1000)-(LOCHQ(J)-(LOCHQ(J)/1000)*1000))**2)                 ASS01160
      DIST=SQRT(DISTSQ)                                                 ASS01170
C     IS HEADQUARTERS CHECKED CORPS MAIN, ALT, OR CORPS ARTY HQ?        ASS01180
      IF(J.GE.4) GO TO 302                                              ASS01190
C     CHECK DISTANCE BETWEEN SITE AND HEADQUARTERS                      ASS01200
      IF(DIST.LE.10.) GO TO 303                                         ASS01210
      GO TO 301                                                         ASS01220
  302 IF(DIST.LE.5.) GO TO 303                                          ASS01230
  301 CONTINUE                                                          ASS01240
C     ASSIGN SITES TO HEADQUARTERS                                      ASS01250
      LOCSIT(I)=LOCSIT(I)+99000000                                      ASS01260
      GO TO 300                                                         ASS01270
  303 LOCSIT(I)=LOCSIT(I)+J*1000000                                     ASS01280
  300 CONTINUE                                                          ASS01290
C                                                                       ASS01300
C*****************************************************************    ASS01310
C                                                                       ASS01320
C     ASSIGN EQUIPMENT TO RADIO RELAY SYSTEMS                           ASS01330
C                                                                       ASS01340
C     IFLAG1 - 1 = CANNOT FIND UNUSED TCC-7 IN MCC-6 FOR SITE           ASS01350
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C                2 = FOUND 1 SPARE TCC-7 IN MCC-6 FOR SITE "FROM"                ASSC136C
C                3 = FOUND 1 SPARE TCC-7 IN MCC-6 FOR SITE "TO"                  ASSC1370
C      IFLAG2 -  0 = SITE IS A TERMINAL                                          ASSC138C
C                1 = SITE IS A RELAY                                             ASSC139C
C      IFLAG3 -  0 = GRC50 IN MRC-102 CHECKED FOR USE AS TERMINAL                ASSC14CC
C                1 = GRC50 IN MRC-102 CHECKED FOR USE AS RELAY                   ASSC1410
C                                                                                ASSC142C
C      DO FOR EACH RADIO RELAY SYSTEM                                            ASSC143C
       DO 400 I=1,50                                                            ASSC144C
       IF(IRRSYS(I).EQ.0)GO TO 400                                              ASSC145C
C      DETERMINE FROM AND TO SITES                                               ASSC146C
       ISITE(1)=(IRRSYS(I)-(IRRSYS(I)/100000)*100000)/1000                      ASSC147C
       ISITE(2)=(IRRSYS(I)-(IRRSYS(I)/1000)*1000)/10                            ASSC148C
       NSTM=IRRSYS(I)/10000C                                                    ASSC149C
C      DO FOR FROM AND TO SITES                                                  ASSC150C
       DO 401 J=1,2                                                             ASSC151C
       IFLAG2=C                                                                 ASSC152C
C      IS THIS A RELAY SITE?                                                     ASSC153C
       IF(LOCSIT(ISITE(J))/10C0000.NE.99)GO TO 420                              ASSC154C
       IFLAG2=1                                                                 ASSC155C
       GO TO 407                                                                ASSC156C
C      IS SITE SUPPORTING CORPS MAIN, ALT, OR ARTY HQ?                           ASSC157C
  420  IF(LOCSIT(ISITE(J))/10C0000.GE.4)GO TO 415                               ASSC158C
C                                                                               ASSC159C
C      SEARCH FOR SPARE TCC-7 IN MCC-6                                           ASSC1ACC
       DO 404 K=23,56                                                           ASSC161C
C      IS TCC-7 USED                                                             ASSC162C
       IF((ITCC7(K)-(ITCC7(K)/100000)*100000)/100.NE.0)GO TO 404                ASSC163C
       NUMVEH=(K-23)/2+1                                                        ASSC164C
       NSITE=(IMCC6(NUMVEH)-(IMCC6(NUMVEH)/10000)*10000)/100                    ASSC165C
C      CHECK FROM OR TO SITE AS APPROPRIATE                                      ASSC166C
       IF(J.EQ.2)GO TO 405                                                      ASSC167C
C      IS SITE OF SPARE TCC-7 THE SITE WE ARE LOOKING FOR?                       ASSC168C
       IF(NSITE.NE.ISITE(1))GO TO 404                                           ASSC169C
       KK=K                                                                     ASSC17CC
       GO TO 407                                                                ASSC171C
  405  IF(NSITE.NE.ISITE(2))GO TO 404                                           ASSC172C
       KK=K                                                                     ASSC173C
       GO TO 407                                                                ASSC174C
  404  CONTINUE                                                                 ASSC175C
       GO TO 415                                                                ASSC176C
C                                                                               ASSC177C
C      SEARCH MRC-103'S FOR SPARE GRC-50'S                                       ASSC178C
C                                                                               ASSC179C
  407  IFLAG1=1                                                                 ASSC18CC
       DO 408 L=45,14C                                                          ASSC181C
C      IS GRC-5C IN USE?                                                         ASSC182C
       IF((IGRC5C(L)-(IGRC50(L)/100000)*100000)/100.NE.0)GO TO 408              ASSC183C
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      NUMVEH=(L-45)/3+1                                                    ASSC1840
      NSITE=(IM103(NUMVEH)-(IM103(NUMVEH)/10000)*10000)/100                ASSC1850
C     CHECK FROM OR TO SITES AS APPROPRAITE                                ASSC1860
      IF(J.EQ.2)GO TO 409                                                  ASSC1870
      IF(NSITE.NE.ISITE(1))GO TO 408                                       ASSC1880
      IF(IFLAG1.EQ.2)GO TO 411                                             ASSC1990
      IFLAG1=2                                                             ASSC1900
      LL=L                                                                 ASSC1910
C     IS NEXT SEQUENCE RADIO IN SAME VEHICLE?                              ASSC1920
  411 IF(NUMVEH.NE.(L-44)/3+1)GO TO 408                                    ASSC1930
      IF(IFLAG2.EQ.0)ITCC7(KK)=ITCC7(KK)+ISITE(2)*100+NSTM*10000+2         ASSC1940
      IGRC50(L)=IGRC50(L)+ISITE(2)*100+NSTM*10000+2                        ASSC1950
      GO TO 401                                                            ASSC1960
  409 IF(NSITE.NE.ISITE(2))GO TO 408                                       ASSC1970
      IF(IFLAG1.EQ.3)GO TO 412                                             ASSC1980
      IFLAG1=3                                                             ASSC1990
      LL=L                                                                 ASSC2000
  412 IF(NUMVEH.NE.(L-44)/3+1)GO TO 408                                    ASSC2010
      IF(IFLAG2.EQ.0)ITCC7(KK)=ITCC7(KK)+ISITE(1)*100+NSTM*10000+2         ASSC2020
      IGRC50(L)=IGRC50(L)+ISITE(1)*100+NSTM*10000+2                        ASSC2030
      GO TO 401                                                            ASSC2040
  408 CONTINUE                                                             ASSC2050
C                                                                          ASSC2060
      GO TO (415,413,414),IFLAG1                                           ASSC2070
C     WAS ABLE TO FIND MRC-103 WITH ONE SPARE RADIO                        ASSC2080
  413 IF(IFLAG2.EQ.0)ITCC7(KK)=ITCC7(KK)+ISITE(2)*100+NSTM*10000+2         ASSC2090
      IGRC50(LL)=IGRC50(LL)+ISITE(2)*100+NSTM*10000+2                      ASSC2100
      GO TO 401                                                            ASSC2110
  414 IF(IFLAG2.EQ.0)ITCC7(KK)=ITCC7(KK)+ISITE(1)*100+NSTM*10000+2         ASSC2120
      IGRC50(LL)=IGRC50(LL)+ISITE(1)*100+NSTM*10000+2                      ASSC2130
      GO TO 401                                                            ASSC2140
C                                                                          ASSC2150
C     SEARCH FOR MRC-102 WITH SPARE EQUIPMENT                              ASSC2160
  415 DO 416 M=1,22                                                        ASSC2170
      IFLAG3=0                                                             ASSC2180
      MM=(2*M)-1                                                           ASSC2190
      IF(IFLAG2.EQ.1)GO TO 421                                             ASSC2200
C     IS TCC-7 USED                                                        ASSC2210
      IF((ITCC7(M)-(ITCC7(M)/100000)*100000)/100.NE.0)GO TO 416            ASSC2220
C     IS GRC-50 USED                                                       ASSC2230
  421 IF((IGRC50(MM)-(IGRC50(MM)/100000)*100000)/100.NE.0)GO TO 422        ASSC2240
      NSITE=(IM102(M)-(IM102(M)/10000)*10000)/100                          ASSC2250
C     ASSIGN TCC-7 AND/OR GRC-50 TO SYSTEMS                                ASSC2260
      IF(J.EQ.2)GO TO 417                                                  ASSC2270
      IF(NSITE.NE.ISITE(1))GO TO 416                                       ASSC2280
      IF(IFLAG2.EQ.0)ITCC7(M)=ITCC7(M)+ISITE(2)*100+NSTM*10000+2           ASSC2290
      IGRC50(MM)=IGRC50(MM)+ISITE(2)*100+NSTM*10000+2                      ASSC2300
      GO TO 401                                                            ASSC2310
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  417 IF(NSITE.NE.ISITE(2))GO TO 419                                    ASSC2320
      IF(IFLAG2.EQ.0)ITOC7(M)=ITOC7(M)+ISITE(1)*100+NSTM*10000+2        ASSC2330
      IGRC50(MM)=IGRC5C(MM)+ISITE(1)*100+NSTM*10000+2                   ASSC2340
      GO TO 401                                                         ASSC2350
C     CHECK FOR SECOND SPARE GRC50 IN MRC-102 IF NECESSARY FOR RELAY    ASSC2360
  422 IF(IFLAG2.EQ.0)GO TO 416                                          ASSC2370
      IF(IFLAG3.EQ.1)GO TO 416                                          ASSC2380
      IFLAG3=1                                                          ASSC2390
      MM=MM+1                                                           ASSC2400
      GO TO 421                                                         ASSC2410
  416 CONTINUE                                                          ASSC2420
C                                                                       ASSC2430
C     WRITE ERROR MESSAGE IF NECESSARY                                  ASSC2440
      IF(J.EQ.1)WRITE(6,418)ISITE(1)                                    ASSC2450
      IF(J.EQ.2)WRITE(6,418)ISITE(2)                                    ASSC2460
  418 FORMAT(/' INSUFFICIENT EQUIPMENT FOR RADIO RELAY SYSTEM AT SITE',  ASSC2470
     1I3/)                                                              ASSC2480
C                                                                       ASSC2490
  401 CONTINUE                                                          ASSC2500
  400 CONTINUE                                                          ASSC2510
C                                                                       ASSC2520
C                                                                       ASSC2530
C*********************************************************************  ASSC2540
C                                                                       ASSC2550
C     ASSIGN AN/GRC-26'S TO H-F SYSTEMS                                 ASSC2560
C                                                                       ASSC2570
      DO 500 I=1,20                                                     ASSC2580
      IF(IHFSYS(I).EQ.0)GO TO 500                                       ASSC2590
C     DETERMINE FROM AND TO SITES                                       ASSC2600
      IFROM=(IHFSYS(I)-(IHFSYS(I)/100000)*100000)/1000                  ASSC2610
      ITO=(IHFSYS(I)-(IHFSYS(I)/1000)*1000)/10                          ASSC2620
      NSTM=IHFSYS(I)/100000                                             ASSC2630
C     DO FOR FROM AND TO SITES                                          ASSC2640
      DO 501 J=1,2                                                      ASSC2650
C     DO FOR EACH AN/GRC-26                                             ASSC2660
      DO 502 K=1,21                                                     ASSC2670
C     IS AN/GRC-26 IN USE?                                              ASSC2680
      IF((IGRC26(K)-(IGRC26(K)/100000)*100000)/100.NE.0)GO TO 502       ASSC2690
C     DETERMINE SITE WHERE AN/GRC-26 IS LOCATED                         ASSC2700
      NSITE=(IV25(K)-(IV25(K)/10000)*10000)/100                         ASSC2710
C     IF UNUSED RADIO IS AT TO OR FROM SITE ASSIGN IT TO THE SYSTEM     ASSC2720
      IF(J.EQ.2)GO TO 503                                               ASSC2730
      IF(NSITE.NE.IFROM)GO TO 502                                       ASSC2740
      IGRC26(K)=IGRC26(K)+ITO*100+NSTM*10000+3                          ASSC2750
      GO TO 501                                                         ASSC2760
  503 IF(NSITE.NE.ITO)GO TO 502                                         ASSC2770
      IGRC26(K)=IGRC26(K)+IFROM*100+NSTM*10000+3                        ASSC2780
      GO TO 501                                                         ASSC2790
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  502 CONTINUE                                                          ASS028CC
C                                                                       ASSC281C
CC      WRITE ERROR MESSAGE SINCE UNUSED AN/GRC-26 CANNOT BE FOUND      ASS02820
C                                                                       ASS02830
        IF(J.EQ.1)WRITE(6,505)IFROM                                     ASS02840
        IF(J.EQ.2)WRITE(6,505)ITO                                       ASS02850
  505 FORMAT(/' INSUFFICIENT AN/GRC26''S AT SITE',I3/)                  ASSC2860
C                                                                       ASS02870
  501 CONTINUE                                                          ASS02880
  500 CONTINUE                                                          ASS02890
C                                                                       ASSC29C0
C       ASSIGN INITIAL SITE ATTACK TIMES                                ASSC2910
        DO 600 IK=1,30                                                  ASSC292C
        ITYPE=LOCSIT(IK)/1000000                                        ASSC2930
        IF(ITYPE)600,600,606                                            ASSC2940
  606 CALL RANDU(IX,IY,YFL)                                             ASSC2950
        IX=IY                                                           ASSC2960
        IF(ITYPE-3)601,601,602                                          ASSC297C
  601 ISITFL(IK)=YFL*115200.                                            ASSC298C
        GO TO 60C                                                       ASSC2990
  602 IF(ITYPE-99)604,605,604                                           ASSC3CC0
  605 ISITFL(IK)=YFL*28800.                                             ASS03010
        GO TO 60C                                                       ASS03020
  604 ISITFL(IK)=YFL*86400.                                             ASS03030
  60C CONTINUE                                                          ASS03040
C                                                                       ASS03050
        RETURN                                                          ASS03C60
C                                                                       ASS03070
        END                                                             ASSC3080


        SUBROUTINE INFAIL(FMEAN,VAR,TRNCB,TRNCT,T,MULT,IARRAY,NUMBER)   INFOC01C
C                                                                       INFOC020
CC      THIS SUBROUTINE ASSIGNS INITIAL FAILURE TIMES TO EQUIPMENT BASED INFCCC3C
CC      ON THE EQUILIBRIUM DISTRIBUTION OF THE TRUNCATED NORMAL PROBABILI-INFOC040
CC      ITY DISTRIBUTION                                                INFCC05C
CC                                                                      INFCC060
CC      IARRAY = ARRAY CONTAINING FAILURE TIMES FOR EQUIPMENT BEING     INFOCC7C
CC               INITIALIZED                                            INFOCC80
CC      NUMBER = NUMBER OF ELEMENTS IN ARRAY                            INFOCC90
CC      T      = TIME AT WHICH RENEWAL PROCESS IS ASSUMED TO HAVE REACHED INF00100
CC               IT'S EQUILIBRIUM DISTRIBUTION                          INFOC110
CC      FMEAN  = MEAN OF NORMAL (TRUNCATED) LIFE DISTRIBUTION DENSITY   INFCC12C
CC      VAR    = VARIANCE OF NORMAL (TRUNCATED) LIFE DISTRIBUTION DENSITY INFOC130
CC      TRNCB  = BOTTOM TRUNCATION VALUE OF LIFE DISTRIBUTION DENSITY   INFCC14C
CC      TRNCT  = TOP TRUNCATION VALUE OF LIFE DISTRIBUTION DENSITY      INFCC15C
C                                                                       INFCC16C
        COMMON/C6/IX                                                    INFCC17C
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      DIMENSION IARRAY(1)                                                INFCC18C
C                                                                        INFCC19C
      DO 1 KK=1,NUMBER                                                   INFCC20C
C     ZERO RUNNING SUM                                                   INFCC21C
      RS=0.                                                              INFCC22C
      S=SQRT(VAR)                                                        INFCC23C
C     TAKE SAMPLE FROM NORMAL DISTRIBUTION                               INFCC24C
   50 CALL GALSS(IX,S,EMEAN,SAMP)                                        INFCC25C
C     CHECK TO SEE IF SAMPLE LIES WITHIN TRUNCATION LIMITS               INFCC26C
      IF(SAMP .LT. TRNCR) GO TO 50                                       INFCC27C
      IF(SAMP.GT.TRNCT)GO TO 50                                          INFCC28C
C     ADD SAMPLE TO RUNNING SUM AND CHECK AGAINST T                      INFCC29C
      RS=RS+SAMP                                                         INFCC30C
      IF(RS.LT.T)GO TO 50                                                INFCC31C
C     CALCULATE TIME TO FAILURE MEASURED FROM T                          INFCC32C
      TFAIL=RS-T                                                         INFCC33C
      IFAIL=TFAIL                                                        INFCC34C
    1 IARRAY(KK)=IARRAY(KK)+MULT*IFAIL                                   INFCC35C
C                                                                        INFCC36C
      RETURN                                                             INFCC37C
      END                                                                INFCC38C


      SUBROUTINE TABLE(NUMSIT)                                           TABCCC1C
C                                                                        TABCCC2C
C     THIS SUBROUTINE PRODUCES A TABLE OF EQUIPMENT AT SITES WITH STATUSTABCCC3C
C     AND IDENTIFIES SYSTEMS USED                                        TABCCC4C
C                                                                        TABCCC5C
C                                                                        TABCCC6C
C     NUM1-NUM5 = SUBSCRIPTS IN ARRAYS FOR ALPHANUMERIC PRINTOUT         TABCCC7C
C     IFLAG1 = INDICATOR THAT VEHICLE PRINTOUT IS TO BE MADE             TABCCC8C
C     IFLAG2 = INDICATOR THAT SYSTEMS PRINTOUT IS TO BE MADE             TABCCC9C
C     IFLAG3 = INDICATOR THAT DEADLINED EQUIPMENT IS TO BE PRINTED       TABCC100
C                                                                        TABCC110
      DIMENSION JSYS(3)                                                  TABCC120
      DOUBLE PRECISION VEHID,EQUIP                                       TABCC130
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV25(21),       TABCC140
     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IHESYS(20),ICRSYS(10),TABCC150
     1IDUM1(30),IGEN(54),LOCHQ(22)                                       TABCC160
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(52)             TABCC170
      COMMON/C3/IREAD,IWRITE                                             TABCC180
C                                                                        TABCC190
      IOUT=6                                                             TABCC200
C     DETERMINE NUMBER OF SITES TO USE                                   TABCC210
      IBOT=NUMSIT                                                        TABCC220
      ITOP=NUMSIT                                                        TABCC230
      IF(NUMSIT)150,150,160                                              TABCC240
  150 IBOT=1                                                             TABCC250
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      ITOP=30                                                          TABOC260
      IF(IWRITE.EQ.1)ICUT=8                                            TABOC270
C                                                                      TABOC280
  160 WRITE(IOUT,500)                                                  TABOC290
  500 FORMAT(/'1',15X,'*',6X,'VEHICLES',6X,'*',10X,'SYSTEMS',10X,'*',  TABOC300
     1/16X,'*',20X,'*',27X,'*'/' SITE  LOCATION *  TYPE    NUM  OPER',  TABOC310
     2' * FROM  TO  NUM  TYPE  OPER * DEADLINED EQUIP')                TABOC320
C                                                                      TABOC330
      DO 1 NSITE=IBOT,ITOP                                             TABOC340
C     IS SITE USED?                                                    TABOC350
      IF(LOCSIT(NSITE).EQ.0)GO TO 1                                    TABOC360
C     PRINT SITE LOCATION AND SUPPORTED HEADQUARTERS ON TABLE          TABOC370
      WRITE(IOUT,200)                                                  TABOC380
  200 FORMAT('**************************************************************TABOC390
     1************************')                                        TABOC400
      ICOORD=LOCSIT(NSITE)-(LOCSIT(NSITE)/1000000)*1000000             TABOC410
      ID=(LOCSIT(NSITE)/1000000)*3-2                                   TABOC420
      IF(ID.EQ.99*3-2)ID=67                                            TABOC430
      ID1=ID+1                                                         TABOC440
      ID2=ID+2                                                         TABOC450
      WRITE(IOUT,201)NSITE,ICOORD,HQ(ID),HQ(ID1),HQ(ID2)               TABOC460
  201 FORMAT(I4,I10,'   *',20X,'*',27X,'*'/1X,3A4,'    *',20X,'*',27X,'*'  TABOC470
     1)                                                                TABOC480
C                                                                      TABOC490
C     CHECK FOR ANY MRC-103'S                                          TABOC500
C                                                                      TABOC510
      DO 2 J=1,32                                                      TABOC520
C     IS MRC-103 AT SITE?                                              TABOC530
      IF((IM103(J)-(IM103(J)/10000)*10000)/100.NE.NSITE)GO TO 2        TABOC540
      NUM1=1                                                           TABOC550
      NUM2=1                                                           TABOC560
C     IS EQUIP DEADLINED?                                              TABOC570
      IF((IM103(J)-(IM103(J)/100)*100)/10.EQ.1)NUM2=2                  TABOC580
C     NUMBER OF FIRST AND LAST RADIOS                                  TABOC590
      IFIRST=44+J*3-2                                                  TABOC600
      JFIRST=IFIRST                                                    TABOC610
      ILAST=IFIRST+2                                                   TABOC620
      IFLAG1=1                                                         TABOC630
  100 IF(IFIRST.GT.ILAST)GO TO 101                                     TABOC640
C     CHECK EACH RADIO FOR SYSTEM                                      TABOC650
      DO 3 K=IFIRST,ILAST                                              TABOC660
      IFIRST=K+1                                                       TABOC670
      ISYS=(IGRC50(K)-(IGRC50(K)/100000)*100000)/100                   TABOC680
C     IS SYSTEM ON RADIO?                                              TABOC690
      IF(ISYS.EQ.0)GO TO 3                                             TABOC700
      NSYS=ISYS/100                                                    TABOC710
      IDSITE=ISYS-(ISYS/100)*100                                       TABOC720
C     PRINT SYSTEM INFO                                                TABOC730
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      IFLAG2=1                                                          TABCC74C
      NUM3=2                                                            TABCC75C
      NUM4=1                                                            TABCC76C
C     CHECK TO SEE IF SYSTEM IS OPERATIONAL                             TABCC77C
      CALL SYSOP(IRRSYS,NSYS,NSITE,IDSITE,NUM4,50,IFROM,ITO,II)         TABCC78C
      GO TO 6                                                           TABCC79C
    3 CONTINUE                                                          TABCC8CC
  101 IFLAG2=C                                                          TABCC81C
C                                                                       TABCC82C
    6 IF(JFIRST.GT.ILAST)GO TO 102                                      TABCC83C
C     CHECK EACH RADIO FOR OPERATIVENESS                                TABCC84C
      DO 7 L=JFIRST,ILAST                                               TABCC85C
C     IS RADIO OPERATIVE                                                TABCC86C
      IF((IGRC5O(L)-(IGRC5C(L)/100)*100)/10.EQ.0)GO TO 7                TABCC87C
      NUM5=1                                                            TABCC88C
      IFLAG3=1                                                          TABCC89C
      JFIRST=JFIRST+1                                                   TABCC9CC
      GO TO 8                                                           TABCC91C
    7 CONTINUE                                                          TABCC92C
  102 IFLAG3=C                                                          TABCC93C
    8 IF(IFLAG1+IFLAG2+IFLAG3.EQ.0)GO TO 2                              TABCC94C
      CALL TABLE1(IFLAG1,IFLAG2,IFLAG3,VEHID,STATUS,SYSTYP,EQUIP,       TABCC95C
     1NUM1,NUM2,NUM3,NUM4,NUM5,IFROM,ITO,NSYS,J,ICUT)                   TABCC96C
      GO TO 1CC                                                         TABCC97C
C                                                                       TABCC98C
    2 CONTINUE                                                          TABCC99C
C                                                                       TABC1CCC
C     CHECK FOR ANY MCC-6'S                                             TABC101C
C     SIMILAR LOGIC TO MRC-103'S, THEREFORE SAME COMMENTS HOLD          TABC102C
C                                                                       TABC103C
      DO 6C2 J=1,17                                                     TABC104C
      IF((IMCC6(J)-(IMCC6(J)/10000)*10000)/100.NE.NSITE)GO TO 602       TABC105C
      NUM1=2                                                            TABC106C
      NUM2=1                                                            TABC107C
      IF((IMCC6(J)-(IMCC6(J)/100)*100)/10.EQ.1)NUM2=2                   TABC108C
      IFIRST=22+J*2-1                                                   TABC109C
      JFIRST=IFIRST                                                     TABC11CC
      ILAST=IFIRST+1                                                    TABC1110
      IFLAG1=1                                                          TABC112C
  7CC IF(IFIRST.GT.ILAST)GO TO 701                                      TABC113C
      DO 6C3 K=IFIRST,ILAST                                             TABC114C
      IFIRST=K+1                                                        TABC115C
      ISYS=(ITCC7(K)-(ITCC7(K)/100000)*100000)/100                      TABC116C
      IF(ISYS.EQ.0)GO TO 603                                            TABC117C
      NSYS=ISYS/100                                                     TABC11FC
      IDSITE=ISYS-(ISYS/100)*100                                        TABC119C
      IFLAG2=1                                                          TABC12CC
      NUM3=ITCC7(K)-(ITCC7(K)/10)*10                                    TABC121C
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      NUM4=1                                                                TAB01220
      GO TO (750,751),NUM3                                                  TAB01230
  750 CALL SYSOP(ICBSYS,NSYS,NSITE,IDSITE,NUM4,10,IFROM,ITO,II)             TAB01240
      GO TO 606                                                             TAB01250
  751 CALL SYSOP(IRRSYS,NSYS,NSITE,IDSITE,NUM4,50,IFROM,ITO,II)             TAB01260
      GO TO 606                                                             TAB01270
  603 CONTINUE                                                              TAB01280
  701 IFLAG2=0                                                              TAB01290
  606 IF(JFIRST.GT.ILAST)GO TO 702                                          TAB01300
      DO 607 L=JFIRST,ILAST                                                 TAB01310
      IF((ITCC7(L)-(ITCC7(L)/100)*100)/10.EQ.0)GO TO 607                    TAB01320
      NUM5=2                                                                TAB01330
      IFLAG3=1                                                              TAB01340
      JFIRST=JFIRST+1                                                       TAB01350
      GO TO 608                                                             TAB01360
  607 CONTINUE                                                              TAB01370
  702 IFLAG3=0                                                              TAB01380
  608 IF(IFLAG1+IFLAG2+IFLAG3.EQ.0)GO TO 602                                TAB01390
      CALL TABLE1(IFLAG1,IFLAG2,IFLAG3,VEHID,STATUS,SYSTYP,EQUIP,NUM1,      TAB01400
     1NUM2,NUM3,NUM4,NUM5,IFROM,ITO,NSYS,J,IOUT)                            TAB01410
      GO TO 700                                                             TAB01420
  602 CONTINUE                                                              TAB01430
C                                                                           TAB01440
C     CHECK FOR MRC-102'S                                                   TAB01450
      DO 802 J=1,22                                                         TAB01460
C     IS MRC-102 AT SITE?                                                   TAB01470
      IF((IM102(J)-(IM102(J)/10000)*10000)/100.NE.NSITE)GO TO 802           TAB01480
C     INITIALIZE ARRAY USED TO PREVENT DUPLICATE LISTING OF SYSTEMS         TAB01490
      DO 899 II=1,3                                                         TAB01500
  899 JSYS(II)=0                                                            TAB01510
      IISYS=1                                                               TAB01520
      NUM1=3                                                                TAB01530
      ICHK1=0                                                               TAB01540
      ICHK2=0                                                               TAB01550
      NUM2=1                                                                TAB01560
C     IS VEHICLE OPERATIVE?                                                 TAB01570
      IF((IM102(J)-(IM102(J)/100)*100)/10.EQ.1)NUM2=2                       TAB01580
C     NUMBER FIRST AND LAST RADIOS                                          TAB01590
      IFIRST=J*2-1                                                          TAB01600
      JFIRST=IFIRST                                                         TAB01610
      ILAST=IFIRST+1                                                        TAB01620
      IFLAG1=1                                                              TAB01630
  900 IF(IFIRST.GT.ILAST)GO TO 901                                          TAB01640
C     CHECK EACH RADIO FOR SYSTEM                                           TAB01650
      DO 803 K=IFIRST,ILAST                                                 TAB01660
      IFIRST=IFIRST+1                                                       TAB01670
      ISYS=(IGRC50(K)-(IGRC50(K)/100000)*100000)/100                        TAB01680
      IF(ISYS.EQ.0)GO TO 803                                                TAB01690
```

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C       FOUND SYSTEM - ENTER IT IN ARRAY PREVENTING DUPLICATE LISTING      TABC17CC
        ICHECK=ISYS*10+IGRC50(K)-(IGRC50(K)/10)*10                         TABC171C
        JSYS(IISYS)=ICHECK                                                 TABC172C
        IISYS=IISYS+1                                                      TABC173C
        NSYS=ISYS/100                                                      TABC174C
        IDSITE=ISYS-(ISYS/100)*100                                         TABC175C
        IFLAG2=1                                                           TABC176C
        NUM3=IGRC50(K)-(IGRC50(K)/10)*10                                   TABC177C
        NUM4=1                                                             TABC178C
        CALL SYSOP(IRRSYS,NSYS,NSITE,IDSITE,NUM4,50,IFROM,ITO,II)          TABC179C
        GO TO 806                                                          TABC1800
  803 CONTINUE                                                             TABC181C
C       CHECK TCC-7 FOR SYSTEM                                             TABC1820
  801 IF(ICHK1.EQ.1)GO TO 950                                              TABC1830
        ICHK1=1                                                            TABC1840
        ISYS=(ITCC7(J)-(ITCC7(J)/100000)*100000)/100                       TABC1850
        IF(ISYS.EQ.0)GO TO 950                                             TABC1860
C       CHECK TO SEE IF SYSTEM HAS ALREADY BEEN LISTED                     TABC1870
        ICHECK=ISYS*10+ITCC7(J)-(ITCC7(J)/10)*10                           TABC1880
        DO 899 JJ=1,IISYS                                                  TABC1890
        IF(JSYS(JJ).EQ.ICHECK)GO TO 950                                    TABC1900
  899 CONTINUE                                                             TABC1910
        NSYS=ISYS/100                                                      TABC1920
        IDSITE=ISYS-(ISYS/100)*100                                         TABC1930
        IFLAG2=1                                                           TABC1940
        NUM3=ITCC7(J)-(ITCC7(J)/10)*10                                     TABC1950
        NUM4=1                                                             TABC1960
        GO TO(952,953),NUM3                                                TABC1970
  952 CALL SYSOP(ICRSYS,NSYS,NSITE,IDSITE,NUM4,10,IFROM,ITO,II)            TABC1980
        GO TO 806                                                          TABC1990
  953 CALL SYSOP(IRRSYS,NSYS,NSITE,IDSITE,NUM4,50,IFROM,ITO,II)            TABC2000
        GO TO 806                                                          TABC2010
  950 IFLAG2=0                                                             TABC2020
C       CHECK FOR OPERATIVENESS OF GRC-50'S                                TABC2030
  806 IF(JFIRST.GT.ILAST)GO TO 802                                         TABC2040
        DO 807 L=JFIRST,ILAST                                              TABC2050
        IF((IGRC50(L)-(IGRC50(L)/100)*100)/10.EQ.0)GO TO 807               TABC2060
        NUM5=1                                                             TABC2070
        IFLAG3=1                                                           TABC2080
        JFIRST=JFIRST+1                                                    TABC2090
        GO TO 956                                                          TABC2100
  807 CONTINUE                                                             TABC2110
C       CHECK FOR OPERATIVENESS OF TCC-7'S                                 TABC2120
  802 IF(ICHK2.EQ.1)GO TO 954                                              TABC2130
        ICHK2=1                                                            TABC2140
        IF((ITCC7(J)-(ITCC7(J)/100)*100)/10.EQ.0)GO TO 954                 TABC2150
        NUM5=2                                                             TABC2160
        IFLAG3=1                                                           TABC2170
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      GO TO 956                                                          TABC21E0
  954 IFLAG3=0                                                           TAB02190
  956 IF(IFLAG1+IFLAG2+IFLAG3.EQ.0)GO TO 802                             TABC22C0
      CALL TABLE1(IFLAG1,IFLAG2,IFLAG3,VEHID,STATUS,SYSTYP,EQUIP,NUM1,   TAB02210
     1NUM2,NUM3,NUM4,NUM5,IFROM,ITC,NSYS,J,IOUT)                         TABC2220
      GO TO 900                                                          TAB02230
  802 CONTINUE                                                           TAB02240
C                                                                        TAB02250
C     CHECK FOR ANY GRC-26'S                                             TAB02260
      DO 302 J=1,21                                                      TAB02270
C     IS GRC-26 AT SITE?                                                 TAB02280
      IF((IV26(J)-(IV26(J)/10000)*10000)/100.NE.NSITE)GO TO 302          TAB02290
      IFLAG1=1                                                           TAB02300
      NUM1=4                                                             TABC2310
      NUM2=1                                                             TABC2320
C     IS VEHICLE OPERABLE                                                TAB02330
      IF((IV26(J)-(IV26(J)/100)*100)/10.EQ.1)NUM2=2                      TAB02340
C     CHECK FOR SYSTEM ON RADIO                                          TAB02350
      ISYS=(IGRC26(J)-(IGRC26(J)/100000)*100000)/100                     TAB02360
      IF(ISYS.EQ.0)GO TO 303                                             TAB02370
      NSYS=ISYS/100                                                      TABC2380
      IDSITE=ISYS-(ISYS/100)*100                                         TAB02390
      IFLAG2=1                                                           TABC24C0
      NUM3=3                                                             TAB02410
      NUM4=1                                                             TAB02420
      CALL SYSOP(IHFSYS,NSYS,NSITE,IDSITE,NUM4,20,IFROM,ITO,II)          TAB02430
      GO TO 306                                                          TAB02440
  303 IFLAG2=0                                                           TABC245C
C     CHECK RADIO FOR OPERATIVENESS                                      TAB02460
  306 IF((IGRC26(J)-(IGRC26(J)/100)*100)/10.EQ.0)GO TO 307               TABC247C
      NUM5=3                                                             TAB02480
      IFLAG3=1                                                           TAB02490
      GO TO 308                                                          TAB02500
  307 IFLAG3=0                                                           TAB02510
  308 IF(IFLAG1+IFLAG2+IFLAG3.EQ.0)GO TO 302                             TAB02520
      CALL TABLE1(IFLAG1,IFLAG2,IFLAG3,VEHID,STATUS,SYSTYP,EQUIP,NUM1,   TABC2530
     1NUM2,NUM3,NUM4,NUM5,IFROM,ITC,NSYS,J,IOUT)                         TABC2540
  302 CONTINUE                                                           TAB02550
C                                                                        TAB02560
    1 CONTINUE                                                           TAB02570
C                                                                        TAB02580
      RETURN                                                             TAB02590
C                                                                        TAB02600
      END                                                                TAB02610

      SUBROUTINE TABLE1(IFLAG1,IFLAG2,IFLAG3,VEHID,STATUS,SYSTYP,EQUIP,  TABCC010
     1NUM1,NUM2,NUM3,NUM4,NUM5,IFROM,ITO,NSYS,J,IOUT)                    TABCC020
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C                                                                       TABCCC30
C     THIS SUBROUTINE PRINTS INDIVIDUAL LINES OF TABLE GENERATED IN     TABCCC40
C     SUBROUTINE TABLE                                                  TABCCC50
C                                                                       TABCCC6C
      DOUBLE PRECISION VEHID(1),EQUIP(1)                                TABCCC7C
      DIMENSION STATUS(1),SYSTYP(1)                                     TABCCC80
C                                                                       TABCCC90
C     PRINT LINE ON TABLE                                               TABCC1CC
  200 IF(IFLAG1+IFLAG2+IFLAG3.NE.3)GO TO 301                            TABCC110
      WRITE(IOUT,201)VEHID(NUM1),J,STATUS(NUM2),IFROM,ITO,NSYS,SYSTYP(NUTABCC120
     1M3),STATUS(NUM4),EQUIP(NUM5)                                      TABCC130
  201 FORMAT(16X,'* ',A8,I3,3X,A4,' *',I4,I5,I4,3X,A4,3X,A4,'* ',A8)    TABCC14C
      GO TO 400                                                         TABCC15C
  301 IF(IFLAG1+IFLAG2.NE.2)GO TO 302                                   TABCC16C
      WRITE(IOUT,201)VEHID(NUM1),J,STATUS(NUM2),IFROM,ITO,NSYS,SYSTYP(NUTABCC17C
     1M3),STATUS(NUM4)                                                  TABCC18C
      GO TO 400                                                         TABCC19C
  302 IF(IFLAG1+IFLAG3.NE.2) GO TO 303                                  TABCC2CC
      WRITE(IOUT,203)VEHID(NUM1),J,STATUS(NUM2),EQUIP(NUM5)             TABCC21C
  203 FORMAT(16X,'* ',A8,I3,3X,A4,' *',27X,'* ',A8)                     TABCC22C
      GO TO 400                                                         TABCC23C
  303 IF(IFLAG2+IFLAG3.NE.2)GO TO 304                                   TABCC240
      WRITE(IOUT,204)IFROM,ITO,NSYS,SYSTYP(NUM3),STATUS(NUM4),EQUIP(NUM5TABCC250
     1)                                                                 TABCC26C
  204 FORMAT(16X,'*',20X,'*',I4,I5,I4,3X,A4,3X,A4,'* ',A8)              TABCC27C
      GO TO 400                                                         TABCC28C
  304 IF(IFLAG1.NE.1)GO TO 305                                          TABCC29C
      WRITE(IOUT,205)VEHID(NUM1),J,STATUS(NUM2)                         TABCC3CC
  205 FORMAT(16X,'* ',A8,I3,3X,A4,' *',27X,'*')                         TABCC31C
      GO TO 400                                                         TABCC32C
  305 IF(IFLAG2.NE.1)GO TO 306                                          TABCC33C
      WRITE(IOUT,206)IFROM,ITO,NSYS,SYSTYP(NUM3),STATUS(NUM4)           TABCC34C
  206 FORMAT(16X,'*',20X,'*',I4,I5,I4,3X,A4,3X,A4,'*')                  TABCC35C
      GO TO 400                                                         TABCC36C
  306 WRITE(IOUT,207)EQUIP(NUM5)                                        TABCC37C
  207 FORMAT(16X,'*',20X,'*',27X,'* ',A8)                               TABCC38C
  400 IFLAG1=C                                                          TABCC39C
C                                                                       TABCC4CC
C                                                                       TABCC41C
      RETURN                                                            TABCC42C
C                                                                       TABCC43C
      END                                                               TABCC44C

      SUBROUTINE SYSOP (ISYS,NSYS,NSITE,IDSITE,NUM4,ITOP,IFROM,ITO,II)  SYSCCC1C
C                                                                       SYSCC02C
C     THIS SUBROUTINE FINDS SYSTEM IN ARRAY AND DETERMINES OPERATIVENESSSYSCCC3C
C                                                                       SYSCC04C
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      DIMENSION ISYS(1)                                                 SYSCC05C
C                                                                       SYSOC060
C     FIND SYSTEM IN ARRAY                                              SYSCC070
      DO 15 II=1,ITOP                                                   SYSOC080
      IF(ISYS(II)/100000.NE.NSYS)GO TO 15                               SYSCC090
C     DETERMINE FROM AND TO SITES OF SYSTEM                             SYSOC100
      IFROM=(ISYS(II)-(ISYS(II)/100000)*100000)/1000                    SYSOC110
      ITO=(ISYS(II)-(ISYS(II)/1000)*1000)/10                            SYSOC120
C     COMPARE FROM AND TO SITES WITH SITES FOR SYSTEM OF INTEREST       SYSOC130
      IF(IFROM.EQ.NSITE)GO TO 16                                        SYSOC140
      IF(IFROM.NE.IDSITE)GO TO 15                                       SYSOC150
      IF(ITO.NE.NSITE)GO TO 15                                          SYSCC160
      GO TO 17                                                          SYSOC170
   16 IF(ITO.NE.IDSITE)GO TO 15                                         SYSOC180
   17 IF(ISYS(II)-(ISYS(II)/10)*10.EQ.1)NUM4=2                          SYSOC190
      RETURN                                                            SYSOC200
   15 CONTINUE                                                          SYSCC210
      NUM4=3                                                            SYSCC220
      RETURN                                                            SYSOC230
C                                                                       SYSOC240
      END                                                               SYSCC250

      SUBROUTINE GENTAB(IPRINT)                                         GENCC010
C                                                                       GENCC020
C     THIS SUBROUTINE PRINTS A TABLE GIVING THE NUMBER AND STATUS OF    GENOC030
C     GENERATORS LOCATED AT EACH SITE                                   GENOC040
C                                                                       GENCC050
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      GENOC060
     1IGRC50(14C),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),GENCC070
     1IDUM1(30),IGEN(54),LCCHQ(22)                                      GENOCC80
      COMMON/C3/IREAD,IWRITE                                            GENCC090
C                                                                       GENOC100
      IOUT=6                                                            GENCC110
      IF(IPRINT)5,5,6                                                   GENOC120
    5 IF(IWRITE.EQ.1)IOUT=8                                             GENOC130
C                                                                       GENOC140
    6 WRITE(IOUT,3)                                                     GENCC150
    3 FORMAT(1H1//16X,'GENERATORS'//' SITE     OPERATIONAL  DEADLINED', GENOC160
     13X,'TOTAL')                                                       GENCC170
C                                                                       GENOC180
      DO 1 NSITE=1,30                                                   GENCC190
C     IS SITE USED?                                                     GENCC200
      IF(LOCSIT(NSITE).EQ.0)GO TO 1                                     GENCC210
C     CHECK GENERATOR ARRAY FOR GENERATORS AT SITE                      GENCC220
C     INITIALIZE COUNTERS                                               GENOC230
      IOP=0                                                             GENOC240
      IDL=0                                                             GENCC250
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      DO 2 I=1,54                                                       GENCC260
      IF((IGEN(I)-(IGEN(I)/10000)*10000)/100.NE.NSITE)GO TO 2           GENCC270
C     INCREMENT NUMBER OF OPERATIONAL GENERATORS                        GENCC280
      IF((IGEN(I)-(IGEN(I)/100)*100)/10.EQ.0)IOP=IOP+1                  GENCC290
C     INCREMENT NUMBER OF DEADLINED GENERATORS                          GENCC300
      IF((IGEN(I)-(IGEN(I)/100)*100)/10.EQ.1)IDL=IDL+1                  GENCC310
    2 CONTINUE                                                          GENCC320
      ITOT=IDL+IOP                                                      GENCC330
C     WRITE LINE IN TABLE                                               GENCC340
      WRITE(IOUT,4)NSITE,IOP,IDL,ITOT                                   GENCC350
    4 FORMAT(I3,3I12)                                                   GENCC360
    1 CONTINUE                                                          GENCC370
C                                                                       GENCC380
      RETURN                                                            GENCC390
C                                                                       GENCC400
      END                                                               GENCC410

      SUBROUTINE SEARCH                                                 SEAOCC10
C                                                                       SEAOCC20
CC    THIS SUBROUTINE PLACES EVENTS IN FUTURE EVENTS CALENDER BY ONE    SEAOCC30
CC    HOUR SEARCHES UNTIL 55 EVENTS ARE IN CALENDAR                     SEAOCC40
C                                                                       SEAOCC50
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      SEAOCC60
     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICRSYS(10  SEAOCC70
     2),IDUM1(30),IGEN(54),LOCHQ(22)                                    SEAOCC80
      COMMON/C4/IG50FL(140),IT7FL(56),IG26FL(21),IGENFL(54),ISITFL(30)  SEAOCC90
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    SEAOC100
C                                                                       SEAOC110
C     DETERMINE LAST SCHEDULED EVENT IN CALENDER                        SEAOC120
      DO 3 I=1,100                                                      SEAOC130
      IF(IEVCAL(I).NE.0)GO TO 3                                         SEAOC140
      J=I                                                               SEAOC150
      GO TO 4                                                           SEAOC160
    3 CONTINUE                                                          SEAOC170
C                                                                       SEAOC180
CC    CHECK AN/GRC-50'S FOR SCHEDULED FAILURES AND INITIALIZE SEARCH    SEAOC190
C     TIME                                                              SEAOC200
    4 ITIME1=0                                                          SEAOC210
    1 ITIME1=ITIME1+60                                                  SEAOC220
      DO 2 I=1,140                                                      SEAOC230
      IF(IG50FL(I).GT.ITIME1)GO TO 2                                    SEAOC240
C     IS RADIO IN USE                                                   SEAOC250
      IF((IGRC50(I)-(IGRC50(I)/100000)*100000)/100.EQ.0)GO TO 2         SEAOC260
C     IS RADIO DEADLINED                                                SEAOC270
      IF((IGRC50(I)-(IGRC50(I)/100)*100)/10.EQ.1)GO TO 2                SEAOC280
      JEVCAL(J)=IG50FL(I)+ITIME                                         SEAOC290
      IEVCAL(J)=11000+I                                                 SEAOC300
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C       SET TIME OF FAILURE IN EQUIPMENT ARRAY EQUAL TO HIGH NUMBER          SEACC310
        IG50FL(I)=99999999                                                   SEA0C320
        J=J+1                                                                SEA0C330
      2 CONTINUE                                                             SEA00340
C                                                                            SEACC350
C       CHECK AN/TCC-7'S FOR SCHEDULED FAILURES                              SEA00360
        DO 5 I=1,56                                                          SEA0C370
        IF(IT7FL(I).GT.ITIME1)GO TO 5                                        SEA0C380
        IF((ITCC7(I)-(ITCC7(I)/100000)*100000)/100.EQ.0)GO TO 5              SEA0C390
        IF((ITCC7(I)-(ITCC7(I)/100)*100)/10.EQ.1)GO TO 5                     SEA00400
        JEVCAL(J)=IT7FL(I)+ITIME                                             SEACC41C
        IEVCAL(J)=12000+I                                                    SEA0C420
        IT7FL(I)=99999999                                                    SEACC430
        J=J+1                                                                SEACC440
      5 CONTINUE                                                             SEACC450
C                                                                            SEA0C460
C       CHECK AN/GRC26'S FOR SCHEDULED FAILURES                              SEACC47C
        DO 6 I=1,21                                                          SEA0C480
        IF(IG26FL(I).GT.ITIME1)GO TO 6                                       SEA0C490
        IF((IGRC26(I)-(IGRC26(I)/100000)*100000)/100.EQ.0)GO TO 6            SEA0C500
        IF((IGRC26(I)-(IGRC26(I)/100)*100)/10.EQ.1)GO TO 6                   SEA00510
        JEVCAL(J)=IG26FL(I)+ITIME                                            SEACC520
        IEVCAL(J)=13000+I                                                    SEA0C530
        IG26FL(I)=99999999                                                   SEA00540
        J=J+1                                                                SEACC550
      6 CONTINUE                                                             SEACC560
C                                                                            SEA0C57C
C       CHECK GENERATORS FOR SCHEDULED FAILURES                              SEACC58C
        DO 7 I=1,54                                                          SEA0C590
        IF(IGENFL(I).GT.ITIME1)GO TO 7                                       SEACC6C0
        IF((IGEN(I)-(IGEN(I)/100000)*100000)/100.EQ.0)GO TO 7                SEA00610
        IF((IGEN(I)-(IGEN(I)/100)*100)/10.EQ.1)GO TO 7                       SEACC62C
        JEVCAL(J)=IGENFL(I)+ITIME                                            SEA0C630
        IEVCAL(J)=14000+I                                                    SEA00640
        IGENFL(I)=99999999                                                   SEA0C650
        J=J+1                                                                SEA0C660
      7 CONTINUE                                                             SEACC67C
C                                                                            SEA0C680
C       CHECK FOR SITE ATTACKS                                               SEACC69C
        DO 8 I=1,30                                                          SEA0C7CC
C       IS SITE IN USE                                                       SEACC71C
        IF(LOCSIT(I))8,8,9                                                   SEA0C720
      9 IF(ISITFL(I).GT.ITIME1)GO TO 8                                       SEACC730
        JEVCAL(J)=ISITFL(I)+ITIME                                            SEA0C74C
        IEVCAL(J)=70000+I                                                    SEACC750
        ISITFL(I)=99999999                                                   SEACC76C
        J=J+1                                                                SEACC77C
      8 CONTINUE                                                             SEACC78C
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C                                                                       SEACC7C0
C     ARE 55 EVENTS IN FUTURE EVENTS CALENDER?                          SEACC8C0
      IF(IEVCAL(55).EQ.0)GO TO 1                                        SEAOC810
C                                                                       SEACC820
C     ORDER EVENTS IN TABLE BY TIME                                     SEACC83C
      CALL ORDERT                                                       SEACC84C
C                                                                       SEACC85C
      RETURN                                                            SEACC86C
      END                                                               SEACC87C

      SUBROUTINE UPDATE (ISUB)                                          UPDCCC1C
C                                                                       UPDCCC02C
C                                                                       UPDCCC03C
C     THIS SUBROUTINE UPDATES THE SCHEDULED FAILURE TIMES OF EQUIPMENT  UPDCCC04C
C     IN USE AS SIMULATION TIME PROGRESSES (SUBTRACTS TIME FROM         UPDCCC05C
C     SCHEDULED FAILURES FOR EQUIPMENT IN OPERATION BUT NOT IN FUTURE   UPDCCC06C
C     EVENTS TABLE)                                                     UPDCCC07C
C                                                                       UPDCCC08C
C                                                                       UPDCCC09C
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      UPDCC1CC
     1IGRC50(14C),ITCC7(56),IGRC26(21),IRRSYS(50),IHESYS(20),           UPDCC11C
     2ICRSYS(1C),IDUM1(3C),IGEN(54),LCCHR(22)                           UPDCC12C
      COMMON/C4/IG50EL(140),IT7EL(56),IG26EL(21),IGENEL(54),ISITEL(30)  UPDCC13C
C                                                                       UPDCC14C
C     UPDATE GRC-50 RADICS                                              UPDCC15C
      DO 1 I=1,140                                                      UPDCC16C
C     IF GRC-50'S ARE IN USE SUBTRACT TIME FROM SCHEDULED FAILURE TIMES UPDCC17C
      IF((IGRC50(I)-(IGRC50(I)/100000)*100000)/100)1,1,2                UPDCC18C
    2 IG50EL(I)=IG50EL(I)-ISUB                                          UPDCC19C
    1 CONTINUE                                                          UPDCC2CC
C                                                                       UPDCC21C
C     UPDATE TCC-7 MULTIPLEXERS                                         UPDCC22C
      DO 3 I=1,56                                                       UPDCC23C
      IF((ITCC7(I)-(ITCC7(I)/100000)*100000)/100)3,3,4                  UPDCC24C
    4 IT7EL(I)=IT7EL(I)-ISUB                                            UPDCC25C
    3 CONTINUE                                                          UPDCC26C
C                                                                       UPDCC27C
C     UPDATE GRC-26 RADICS                                              UPDCC28C
      DO 5 I=1,21                                                       UPDCC29C
      IF((IGRC26(I)-(IGRC26(I)/100000)*100000)/100)5,5,6                UPDCC3CC
    6 IG26EL(I)=IG26EL(I)-ISUB                                          UPDCC31C
    5 CONTINUE                                                          UPDCC32C
C                                                                       UPDCC33C
C     UPDATE GENERATORS                                                 UPDCC34C
      DO 7 I=1,54                                                       UPDCC35C
      IF((IGEN(I)-(IGEN(I)/10000)*10000)/100)7,7,8                      UPDCC36C
    8 IGENEL(I)=IGENEL(I)-ISUB                                          UPDCC37C
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      7 CONTINUE                                                        UPDCC380
C                                                                       UPDCC390
C     UPDATE SITE ATTACKS                                               UPDCC4C0
      DO 9 I=1,30                                                       UPDCC410
      IF(LOCSIT(I))9,9,10                                               UPDCC420
     10 ISITFL(I)=ISITFL(I)-ISUB                                        UPDCC430
      9 CONTINUE                                                        UPDCC440
C                                                                       UPDCC450
      RETURN                                                            UPDCC460
      END                                                               UPDCC470


      SUBROUTINE SWITCH                                                 SWICCC1C
C                                                                       SWICCC20
CC    THIS SUBROUTINE DETERMINES THE APPROPRIATE SUBROUTINE TO          SWICCC30
CC    PROCESS THE CURRENT EVENT                                         SWICCC40
C                                                                       SWICCC50
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    SWICCC60
C                                                                       SWICCC70
CC    IF ACTION IS INITIATED BY THE SIMULATION GO TO THE APPROPRIATE     SWICCC80
C     SUBROUTINE                                                        SWICCC90
      IDUM=IEVCUR/10000                                                 SWICCC100
      GO TO(1,2,3,4,5,6,7),IDUM                                         SWICCC110
C                                                                       SWICCC120
CC    IF ACTION IS INITIATED BY THE PLAYER GO TO THE APPROPRIATE        SWICCC130
C     SUBROUTINE                                                        SWICCC140
      IDUM1=IEVCUR/100                                                  SWICCC150
      NUMB=IEVCUR-IDUM1*100                                             SWICCC160
      GO TO(10,11,12,13,14,15),IDUM1                                    SWICCC170
      IF(IEVCUR.NE.999)RETURN                                           SWICCC180
C                                                                       SWICCC190
      WRITE(6,200)                                                      SWICCC200
    200 FORMAT(///' GAME HAS BEEN TERMINATED'///)                       SWICCC210
      CALL EXIT                                                         SWICCC220
      1 CALL EQFAIL                                                     SWICCC230
      GO TO 100                                                         SWICCC240
      2 CALL EQREP                                                      SWICCC250
      GO TO 100                                                         SWICCC260
      3 NUMB=(IEVCUR-(IEVCUR/10000)*10000)/1000+3                       SWICCC270
      CALL EQINST(NUMB)                                                 SWICCC280
      GO TO 100                                                         SWICCC290
      4 NUMB=(IEVCUR-(IEVCUR/10000)*10000)/1000+5                       SWICCC300
      CALL VEHMOV(NUMB)                                                 SWICCC310
      GO TO 100                                                         SWICCC320
      5 NUMB=(IEVCUR-(IEVCUR/10000)*10000)/1000                         SWICCC330
      CALL VEHBKD(NUMB)                                                 SWICCC340
      GO TO 100                                                         SWICCC350
      6 NUMB=(IEVCUR-(IEVCUR/10000)*10000)/1000                         SWICCC360
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      CALL VEHREP(NUMB)                                                 SWICC370
      GO TO 100                                                         SWICC380
    7 CALL SITACK                                                       SWICC390
      GO TO 100                                                         SWICC400
   10 IF(NUMB-50)20,21,21                                               SWICC410
   21 CALL GENTAB(1)                                                    SWICC420
      GO TO 100                                                         SWICC430
   20 CALL TABLE(NUMB)                                                  SWICC440
      GO TO 100                                                         SWICC450
   11 CALL EQREM(NUMB)                                                  SWICC460
      GO TO 100                                                         SWICC470
   12 CALL EQINST(NUMB)                                                 SWICC480
      GO TO 100                                                         SWICC490
   13 CALL SYSREM(NUMB)                                                 SWICC500
      GO TO 100                                                         SWICC510
   14 CALL SYINST(NUMB)                                                 SWICC520
      GO TO 100                                                         SWICC530
   15 CALL VEHMOV(NUMB)                                                 SWICC540
  100 RETURN                                                            SWICC550
C                                                                       SWICC560
      END                                                               SWICC570

      SUBROUTINE EQFAIL                                                 EQFCC010
C                                                                       EQFCC020
C     THIS SUBROUTINE PRINTS MESSAGES DESCRIBING EQUIPMENT FAILURES,    EQFCC030
C     ASSIGNS AND PRINTS ESTIMATE OF REPAIR TIME, ASSIGNS ACTUAL REPAIR EQFCC040
C     TIME, AND SCHEDULES REPAIR EVENT                                  EQFCC050
C                                                                       EQFCC060
      DOUBLE PRECISION VEHID,EQUIP                                      EQFCC070
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      EQFCC080
     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICRSYS(10),EQFCC090
     2IDUM1(30),IGEN(54),LCCHQ(22)                                      EQFCC100
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(49)            EQFCC110
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    EQFCC120
      COMMON/C6/IX                                                      EQFCC130
C                                                                       EQFCC140
C     DETERMINE UNIT NUMBER AND FAILURE TYPE                            EQFCC150
      IUNIT=IEVCUR-(IEVCUR/1000)*1000                                   EQFCC160
      IEQTYP=(IEVCUR-(IEVCUR/10000)*10000)/1000                         EQFCC170
C     CHOOSE FAILURE FORMAT TYPE                                        EQFCC180
      GO TO (11,12,13,14),IEQTYP                                        EQFCC190
C                                                                       EQFCC200
C     GRC-50 FAILURE                                                    EQFCC210
C     DETERMINE VEHICLE TYPE, NUMBER, SYSTEM NUMBER, AND TO AND FROM LOCEQFCC220
   11 IVEHTP=IGRC50(IUNIT)/10000000                                     EQFCC230
      IVEHNO=(IGRC50(IUNIT)-(IGRC50(IUNIT)/10000000)*10000000)/100000   EQFCC240
      ISYSNO=(IGRC50(IUNIT)-(IGRC50(IUNIT)/100000)*100000)/10000        EQFCC250
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      ITO=(IGRC50(IUNIT)-(IGRC50(IUNIT)/10000)*10000)/100                    EQFCC260
      IF(IVEHTP-1)1,1,2                                                      EQFCC270
    1 IFROM=(IM102(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100                  EQFCC280
      NUM1=3                                                                 EQFCC290
      GO TO 3                                                                EQFCC300
    2 IFROM=(IM103(IVEHNO)-(IM103(IVEHNO)/10000)*10000)/100                  EQFCC310
      NUM1=1                                                                 EQFCC320
C     CHANGE FLAGS ON EQUIPMENT AND SYSTEM UNITS FOR DEADLINED EQUIP         EQFCC330
    3 IGRC50(IUNIT)=IGRC50(IUNIT)+10                                         EQFCC340
      IF(ITO)8CC,800,8C1                                                     EQFCC350
C     LOCATE SYSTEM                                                          EQFCC360
  8C1 CALL SYSOP(IRRSYS,ISYSNO,IFROM,ITO,NUM4,50,K,KK,I)                     EQFCC370
      IF(IRRSYS(I)-(IRRSYS(I)/10)*10)700,700,8                               EQFCC380
  7CC IRRSYS(I)=IRRSYS(I)+1                                                  EQFCC390
C     DETERMINE ARRAY SUBSCRIPTS FOR PRINTOUT                                EQFCC400
    8 IF(LOCSIT(IFROM)/1000000-22)300,300,301                                EQFCC410
  301 NUM2=3*23-2                                                            EQFCC420
      GO TO 302                                                              EQFCC430
  300 NUM2=3*(LOCSIT(IFROM)/1000000)-2                                       EQFCC440
  302 IF(ITO-22)303,304,304                                                  EQFCC450
  304 NUM3=3*23-2                                                            EQFCC460
      GO TO 305                                                              EQFCC470
  303 NUM3=3*ITO-2                                                           EQFCC480
C     WRITE PLAYER MESSAGE                                                   EQFCC490
  305 WRITE(6,9)VEHID(NUM1),IVEHNO,HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),IFROM,     EQFCC500
     1ISYSNO,HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),IFROM,HQ(NUM3),HQ(NUM3+1),       EQFCC510
     2HQ(NUM3+2),ITO                                                         EQFCC520
    9 FORMAT(/18H EQUIPMENT FAILURE/5X,18HAN/GRC-50 RADIO IN,A9,             EQFCC530
     17H NUMBER,I3,12H LOCATED AT ,3A4,6H (SITE,I3,1H)/5X,44HFAILED. RADIO   EQFCC540
     2IO WAS OPERATING ON SYSTEM NUMBER,I3,6H FROM ,3A4,6H (SITE,I3,1H)/     EQFCC550
     35X,3HTO ,3A4,6H (SITE,I3,1H))                                          EQFCC560
      GO TO 101                                                              EQFCC570
  800 WRITE(6,802)VEHID(NUM1),IVEHNO                                         EQFCC580
  802 FORMAT(/19H AN/GRC-50 RADIO IN,A9,6HNUMBER,I3,18H HAS BEEN DAMAGED     EQFCC590
     1.)                                                                     EQFCC600
C     SCHEDULE REPAIR EVENT                                                  EQFCC610
  101 CALL GAUSS(IX,150.,300.,REP)                                           EQFCC620
      IREP=REP                                                               EQFCC630
      IF(IREP)1C1,200,200                                                    EQFCC640
  200 IEVCAL(100)=21000+IUNIT                                                EQFCC650
      GO TO 100                                                              EQFCC660
C                                                                            EQFCC670
C     TCC-7 FAILURE                                                          EQFCC680
C     DETERMINE VEHICLE TYPE, NUMBER, SYSTEM NUMBER,AND TO AND FROM LOC      EQFCC690
   12 IVEHTP=ITCC7(IUNIT)/10000000                                           EQFCC700
      IVEHNO=(ITCC7(IUNIT)-(ITCC7(IUNIT)/10000000)*10000000)/100000          EQFCC710
      ISYSNO=(ITCC7(IUNIT)-(ITCC7(IUNIT)/100000)*100000)/10000               EQFCC720
      ITO=(ITCC7(IUNIT)-(ITCC7(IUNIT)/10000)*10000)/100                      EQFCC730
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      IF(IVEHTP-1)15,15,16                                                  EQFCC74C
   15 IFROM=(IM102(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100                 EQFCC75C
      NUM1=3                                                                EQFCC76C
      GO TO 17                                                              EQFCC77C
   16 IFROM=(IMCC6(IVEHNO)-(IMCC6(IVEHNO)/10000)*10000)/100                 EQFCC78C
      NUM1=2                                                                EQFCC79C
   17 ISYSTP=ITCC7(IUNIT)-(ITCC7(IUNIT)/10)*10                              EQFCC8CC
C                                                                           EQFCC81C
C     CHANGE FLAGS ON EQUIPMENT AND SYSTEM UNITS TO REFLECT DEACLINED EQ    EQFCC82C
      ITCC7(IUNIT)=ITCC7(IUNIT)+10                                          EQFCC83C
      IF(ITO)8C3,8C3,8C4                                                    EQFCC84C
C     LOCATE SYSTEM IN ARRAY                                                EQFCC85C
  8C4 IF(ISYSTP-1)18,18,19                                                  EQFCC86C
   18 CALL SYSOP(ICBSYS,ISYSNO,IFROM,ITO,NUM4,10,K,KK,I)                    EQFCC87C
      IF(ICBSYS(I)-(ICBSYS(I)/10)*10)20,20,24                               EQFCC88C
   2C ICBSYS(I)=ICBSYS(I)+1                                                 EQFCC89C
      GO TO 24                                                              EQFCC9CC
   19 CALL SYSOP(IRRSYS,ISYSNO,IFROM,ITO,NUM4,50,K,KK,I)                    EQFCC91C
      IF(IRRSYS(I)-(IRRSYS(I)/10)*10)22,22,24                               EQFCC92C
   22 IRRSYS(I)=IRRSYS(I)+1                                                 EQFCC93C
   24 IF(LOCSIT(IFROM)/1000000-22)400,400,401                               EQFCC94C
  401 NUM2=3*23-2                                                           EQFCC95C
      GO TO 402                                                             EQFCC96C
  400 NUM2=3*(LOCSIT(IFROM)/1000000)-2                                      EQFCC97C
  402 IF(ITO-22)403,404,404                                                 EQFCC98C
  404 NUM3=3*23-2                                                           EQFCC99C
      GO TO 405                                                             EQFC1CCC
  403 NUM3=3*ITO-2                                                          EQFC1C1C
  405 WRITE(6,26)VEHID(NUM1),IVEHNO,HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),         EQFC1C2C
     1IFROM,SYSTYP(ISYSTP),ISYSNO,HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),IFROM,     EQFC1C3C
     2HQ(NUM3),HQ(NUM3+1),HQ(NUM3+2),ITO                                    EQFC1C4C
   26 FORMAT(/18H EQUIPMENT FAILURE/5X,21HAN/TCC-7 MULTIPLEX IN,A9,         EQFC1C5C
     17H NUMBER,I3,12H LOCATED AT ,3A4,5H(SITE,I3,1H)/5X,                   EQFC1C6C
     235HFAILED. MULTIPLEX WAS OPERATING ON ,A4,13HSYSTEM NUMBER,I3,        EQFC1C7C
     36H FROM ,3A4,6H (SITE,I3,1H)/5X,3HTO ,3A4,6H (SITE,I3,1H))           EQFC1C8C
      GO TO 102                                                             EQFC1C9C
  8C2 WRITE(6,8C5)VEHID(NUM1),IVEHNO                                        EQFC11CC
  805 FORMAT(/22H AN/TCC-7 MULTIPLEX IN,A9,6HNUMBER,I3,                     EQFC1111C
     118H HAS BEEN DAMAGED.)                                                EQFC11120
C     SCHEDULE REPAIR EVENT                                                 EQFC1113C
  102 CALL GAUSS(IX,150.,300.,REP)                                          EQFC1114C
      IREP=REP                                                              EQFC1115C
      IF(IREP)1C2,201,201                                                   EQFC1116C
  201 IEVCAL(100)=22000+IUNIT                                               EQFC1117C
      GO TO 100                                                             EQFC1118C
C                                                                           EQFC1119C
C     GRC-26 RADIO FAILURE                                                  EQFC1120C
   13 ISYSNO=(IGRC26(IUNIT)-(IGRC26(IUNIT)/100000)*100000)/10000            EQFC1121C
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      ITO=(IGRC26(IUNIT)-(IGRC26(IUNIT)/10000)*10000)/100                EQF01220
      IFROM=(IV26(IUNIT)-(IV26(IUNIT)/10000)*10000)/100                  EQF01230
C     CHANGE FLAGS ON EQUIPMENT AND SYSTEM UNITS TO REFLECT DEADLINED EQ EQF01240
      IGRC26(IUNIT)=IGRC26(IUNIT)+10                                     EQF01250
C     LOCATE SYSTEM IN ARRAY                                             EQF01260
      IF(ITO)806,806,807                                                 EQF01270
  807 CALL SYSOP(IHFSYS,ISYSNO,IFROM,ITO,NUM4,20,K,KK,I)                 EQF01280
      IF(IHFSYS(I)-(IHFSYS(I)/10)*10)27,27,31                            EQF01290
   27 IHFSYS(I)=IHFSYS(I)+1                                              EQF01300
   31 IF(LOCSIT(IFROM)/1000000-22)500,500,501                            EQF01310
  501 NUM2=3*23-2                                                        EQF01320
      GO TO 502                                                          EQF01330
  500 NUM2=3*(LOCSIT(IFROM)/1000000)-2                                   EQF01340
  502 IF(ITO-22)503,504,504                                              EQF01350
  504 NUM3=3*23-2                                                        EQF01360
      GO TO 505                                                          EQF01370
  503 NUM3=3*ITO-2                                                       EQF01380
  505 WRITE(6,32)IUNIT,HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),IFROM,ISYSNO,      EQF01390
     1HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),IFROM,HQ(NUM3),HQ(NUM3+1),          EQF01400
     2HQ(NUM3+2),ITO                                                     EQF01410
   32 FORMAT(/18H EQUIPMENT FAILURE/5X,33HAN/GRC-26 RADIO IN VEHICLE NUM EQF01420
     1BER,I3,12H LOCATED AT ,3A4,6H (SITE,I3/1H)/5X,44HFAILED. RADIO WAS EQF01430
     2 OPERATING ON SYSTEM NUMBER,I3,6H FROM ,3A4,6H (SIE,,I3,1H)/5X,    EQF01440
     33HTO ,3A4,6H (SITE,I3,1H))                                         EQF01450
C     SCHEDULE REPAIR EVENT                                              EQF01460
  103 CALL GAUSS(IX,150.,300.,REP)                                       EQF01470
      IREP=REP                                                           EQF01480
      IF(IREP)103,202,202                                                EQF01490
  202 IEVCAL(100)=23000+IUNIT                                            EQF01500
      GO TO 100                                                          EQF01510
C                                                                        EQF01520
C     GENERATOR FAILURE                                                  EQF01530
   14 IFROM=(IGEN(IUNIT)-(IGEN(IUNIT)/10000)*10000)/100                  EQF01540
      IF(LOCSIT(IFROM)/1000000-22)600,600,601                            EQF01550
  601 NUM2=3*23-2                                                        EQF01560
      GO TO 602                                                          EQF01570
  600 NUM2=3*(LOCSIT(IFROM)/1000000)-2                                   EQF01580
C     CHANGE FLAG ON GENERATOR TO FAILED                                 EQF01590
  602 IGEN(IUNIT)=IGEN(IUNIT)+10                                         EQF01600
      WRITE(6,33)IUNIT,HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),IFROM              EQF01610
   33 FORMAT(/18H EQUIPMENT FAILURE/5X,16HGENERATOR NUMBER,I3,           EQF01620
     112H LOCATED AT ,3A4,6H (SITE,I3,9H) FAILED.)                       EQF01630
      GO TO 104                                                          EQF01640
  806 WRITE(6,808)VEHID(NUM1),IVEHNO                                     EQF01650
  808 FORMAT(/19H AN/GRC-26 RADIO IN,A9,6HNUMBER,I3,18H HAS BEEN DAMAGED EQF01660
     1.)                                                                 EQF01670
C                                                                        EQF01680
C     SCHEDULE REPAIR EVENT                                              EQF01690
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  104 CALL GAUSS(IX,150.,300.,REP)                                      EQFC17CC
      IREP=REP                                                          EQFC171C
      IF(IREP)104,203,203                                               EQFC172C
  203 IEVCAL(100)=2400C+IUNIT                                           EQFC173C
C                                                                       EQFC174C
CC    DETERMINE ESTIMATED TIME OF REPAIR FOR THE PLAYER, SCHEDULE       EQFC175C
C     TIME OF REPAIR EVENT, ORDER EVENTS                                EQFC176C
  100 JEVCAL(100)=IREP+ITIME                                            EQFC177C
      CALL ORDERT                                                       EQFC178C
  205 CALL GAUSS(IX,50.,REP,EST)                                        EQFC179C
      IEST=EST                                                          EQFC180C
      IF(IEST)205,204,204                                               EQFC181C
C     PRINT PLAYER MESSAGE                                              EQFC182C
  204 IHOUR=C                                                           EQFC183C
  252 IF(IEST-60)250,251,251                                            EQFC184C
  251 IHOUR=IHOUR+1                                                     EQFC185C
      IEST=IEST-60                                                      EQFC186C
      GO TO 252                                                         EQFC187C
  250 WRITE (6,253)IHOUR,IEST                                           EQFC188C
  253 FORMAT(/5X,24HESTIMATED REPAIR TIME IS,I3,6H HOURS,I3,5H MIN.)    EQFC189C
C                                                                       EQFC190C
      RETURN                                                            EQFC191C
      END                                                               EQFC192C

      SUBROUTINE EQREP                                                  EQRCCC10
C                                                                       EQRCCC2C
CC    THIS SUBROUTINE PRINTS MESSAGES WHEN COMMUNICATIONS EQUIPMENT IS  EQRCCC3C
CC    REPAIRED, RETURNS EQUIPMENT TO OPERATIONAL STATUS, SCHEDULES NEW  EQRCCC4C
CC    EQUIPMENT FAILURE TIME, AND RETURNS SYSTEM TO OPERATION IF        EQRCCC5C
CC    EQUIPMENT WAS ON A SYSTEM AND NO OTHER DEADLINED EQUIPMENT        EQRCCC6C
CC    EXISTS ON THE SYSTEM                                              EQRCCC7C
C                                                                       EQRCCC8C
      DOUBLE PRECISION VEHID,EQUIP                                      EQRCCC9C
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      EQRCC100
     1IGRC50(14C),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),EQRCC110
     2IDUM1(3C),IGEN(54),LOCHQ(22)                                      EQRCC120
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(69)            EQRCC130
      COMMON/C4/IG50FL(140),IT7FL(56),IG26FL(21),IGENFL(54),ISITFL(30)  EQRCC140
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    EQRCC150
      COMMON/C6/IX                                                      EQRCC160
C                                                                       EQRCC17C
C     DETERMINE UNIT NUMBER AND TYPE                                    EQRCC180
      IUNIT=IEVCUR-(IEVCUR/1000)*1000                                   EQRCC190
      IEQTYP=(IEVCUR-(IEVCUR/10000)*10000)/1000                         EQRCC200
      GO TO(1,2,3,4),IEQTYP                                             EQRCC210
C                                                                       EQRCC22C
C     GRC-5C                                                            EQRCC23C
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C       DETERMINE RADIO SITE AND VEHICLE INFORMATION                    EQR0C240
     1 IVEHTP=IGRC50(IUNIT)/10000000                                    EQR0C250
       IVEHNO=(IGRC50(IUNIT)-(IGRC50(IUNIT)/10000000)*10000000)/100000  EQR0C260
       IF(IVEHTP-1)12,12,13                                             EQR0C270
    12 IFROM=(IM1C2(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100            EQR0C280
       NUM1=3                                                           EQR0C290
       GO TO 14                                                         EQR0C300
    13 IFROM=(IM103(IVEHNO)-(IM103(IVEHNO)/10000)*10000)/100            EQR0C310
       NUM1=1                                                           EQR0C320
C       DETERMINE ARRAY SUBSCRIPTS FOR PRINTOUT                         EQR0C330
    14 IF(LOCSIT(IFROM)/1000000-22)300,300,301                          EQR0C340
   301 NUM2=3*23-2                                                      EQR0C350
       GO TO 302                                                        EQR0C360
   300 NUM2=3*(LOCSIT(IFROM)/1000000)-2                                 EQR0C370
C       WRITE PLAYER MESSAGE                                            EQR0C380
   302 WRITE(6,303)VEHID(NUM1),IVEHNO,HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),   EQR0C390
      1IFROM                                                            EQR0C400
   303 FORMAT(/17H EQUIPMENT REPAIR/5X,18HAN/GRC-50 RADIO IN,A9,        EQR0C410
      17H NUMBER,I3,12H LOCATED AT ,3A4,6H (SITE,I3,1H)/5X,             EQR0C420
      218HHAS BEEN REPAIRED.)                                           EQR0C430
C       CHANGE FLAG ON RADIO                                            EQR00440
       IGRC50(ILNIT)=IGRC50(ILNIT)-10                                   EQR0C450
C       SCHEDULE NEXT FAILURE TIME FOR RADIO                            EQR00460
   985 CALL GAUSS(IX,2880.,5760.,FAIL)                                 EQR0C470
       IF(FAIL)985,976,976                                              EQR00480
   976 IFAIL=FAIL                                                       EQR0C490
       IG50FL(ILNIT)=IFAIL+ITIME                                        EQR0C500
C       IF RADIO IS CONNECTED TO A SYSTEM AND THE SYSTEM CAN NOW OPERATE -EQR0C510
C       CHANGE STATUS OF SYSTEM                                         EQR0C520
       IF((IGRC50(IUNIT)-(IGRC50(IUNIT)/100000)*100000)/100)400,400,401 EQR0C530
C       WILL SYSTEM OPERATE WHEN THIS SYSTEM IS REPAIRED                EQR0C540
   401 ISYSNO=(IGRC50(ILNIT)-(IGRC50(IUNIT)/100000)*100000)/10000       EQR0C550
       ITO=(IGRC50(IUNIT)-(IGRC50(IUNIT)/10000)*10000)/100              EQR00560
C       IF FUTURE EVENTS CALENDER CONTAINS EQUIPMENT COMPLETION EVENT ON EQR0C570
C       SAME SYSTEM - RETURN                                            EQR0C580
       CALL CKEVNT(IFROM,ITO,2,ISYSNO,IRESLT)                           EQR0C590
       IF(IRESLT)700,700,400                                            EQR00600
   700 CALL OP50(IFROM,ITO,ISYSNO,IUNIT)                                EQR0C610
       GO TO 400                                                        EQR00620
C                                                                       EQR0C630
C       TCC-7                                                           EQR00640
C       DETERMINE RADIO SITE AND VEHICLE INFORMATION                    EQR0C650
     2 IVEHTP=ITCC7(IUNIT)/10000000                                     EQR0C660
       IVEHNO=(ITCC7(IUNIT)-(ITCC7(IUNIT)/10000000)*10000000)/100000    EQR0C670
       IF(IVEHTP-1)512,512,513                                          EQR0C680
   512 IFROM=(IM1C2(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100            EQR0C690
       NUM1=3                                                           EQR0C700
       GO TO 514                                                        EQR0C710
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  513 IFROM=(IMCC6(IVEHNO)-(IMCC6(IVEHNO)/10000)*10000)/100                EQRCC72C
      NUM1=2                                                               EQRCC73C
C     DETERMINE ARRAY SUBSCRIPTS FOR PRINTOUT                              EQRCC74C
  514 IF(LOCSIT(IFROM)/1000000-22)550,550,551                              EQRCC75C
  551 NUM2=3*23-2                                                          EQRCC76C
      GO TO 552                                                            EQRCC77C
  550 NUM2=3*(LOCSIT(IFROM)/1000000)-2                                     EQRCC78C
C     DETERMINE TYPE OF SYSTEM                                             EQRCC79C
  552 ISYSTP=ITCC7(IUNIT)-(ITCC7(IUNIT)/10)*10                             EQRCC8CC
C     WRITE PLAYER MESSAGE                                                 EQRCC81C
      WRITE(6,553)VEHID(NUM1),IVEHNO,HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),       EQRCC82C
     1IFROM                                                                EQRCC83C
  553 FORMAT(/17H EQUIPMENT REPAIR/5X,21HAN/TCC-7 MULTIPLEX IN,A9,          EQRCC84C
     17H NUMBER,I3,12H LOCATED AT ,3A4,6H (SITE,I3,1H)/5X,                 EQRCC85C
     218HHAS BEEN REPAIRED.)                                               EQRCC86C
C     CHANGE FLAG ON MULTIPLEX                                             EQRCC87C
      ITCC7(IUNIT)=ITCC7(IUNIT)-10                                         EQRCC88C
C     SCHEDULE NEXT FAILURE TIME FOR MULTIPLEX                             EQRCC89C
  977 CALL GAUSS(IX,2880.,5760.,FAIL)                                      EQRCC9CC
      IF(FAIL)977,978,978                                                  EQRCC91C
  978 IFAIL=FAIL                                                           EQRCC92C
      IT7FL(IUNIT)=IFAIL+ITIME                                             EQRCC93C
C     IF MULTIPLEX IS CONNECTED TO A SYSTEM AND THE SYSTEM CAN NOW         EQRCC94C
C     OPERATE - CHANGE STATUS OF SYSTEM                                    EQRCC95C
      IF((ITCC7(IUNIT)-(ITCC7(IUNIT)/100000)*100000)/100)400,400,601       EQRCC96C
  601 ISYSNO=(ITCC7(IUNIT)-(ITCC7(IUNIT)/100000)*100000)/10000             EQRCC97C
      ITO=(ITCC7(IUNIT)-(ITCC7(IUNIT)/10000)*10000)/100                    EQRCC98C
C     IF FUTURE EVENTS CALENDER CONTAINS EQUIPMENT COMPLETION EVENT ON     EQRCC99C
C     SAME SYSTEM - RETURN                                                 EQRC1CCC
      CALL CKEVNT(IFROM,ITO,ISYSTP,ISYSNO,IRESLT)                          EQRC1C1C
      IF(IRESLT)701,701,400                                                EQRC1C2C
  701 CALL OP7(IFROM,ITO,ISYSNO,ISYSTP,IUNIT)                              EQRC1C3C
      GO TO 400                                                            EQRC1C4C
C                                                                          EQRC1C5C
C     GRC-26                                                               EQRC1C6C
C     DETERMINE RADIO SITE AND VEHICLE INFORMATION                         EQRC1C7C
    3 IFROM=(IV26(IUNIT)-(IV26(IUNIT)/10000)*10000)/100                    EQRC1C8C
      IF(LOCSIT(IFROM)/1000000-22)800,800,801                              EQRC1C9C
  801 NUM2=2*23-2                                                          EQRC11CC
      GO TO 802                                                            EQRC111C
  800 NUM2=3*(LOCSIT(IFROM)/1000000)-2                                     EQRC1120
C     WRITE PLAYER MESSAGE                                                 EQRC113C
  802 WRITE(6,803)IUNIT,HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),IFROM               EQRC1140
  803 FORMAT(/17H EQUIPMENT REPAIR/5X,32HRADIO IN ANGRC-26 VEHICLE NUMBEREQRC1150
     1R,I3,12H LOCATED AT ,3A4,6H(SITE,I3,1H)/5X,18HHAS BEEN REPAIRED.)    EQRC116C
C     CHANGE FLAG ON RADIO                                                 EQRC117C
      IGRC26(IUNIT)=IGRC26(IUNIT)-10                                       EQRC118C
C     SCHEDULE NEXT FAILURE TIME FOR RADIO                                 EQRC119C
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  979 CALL GAUSS(IX,2880.,5760.,FAIL)                                    EQR01200
      IF(FAIL)979,980,980                                                EQR01210
  980 IFAIL=FAIL                                                         EQR01220
      IG26FL(IUNIT)=IFAIL+ITIME                                          EQR01230
C     IF RADIO IS CONNECTED TO A SYSTEM AND THE SYSTEM CAN NOW           EQR01240
C     OPERATE - CHANGE STATUS OF SYSTEM                                  EQR01250
      IF((IGRC26(IUNIT)-(IGRC26(IUNIT)/100000)*100000)/100)400,400,901   EQR01260
C     WILL SYSTEM OPERATE WHEN THIS RADIO IS REPAIRED?                   EQR01270
  901 ISYSNO=(IGRC26(IUNIT)-(IGRC26(IUNIT)/100000)*100000)/10000         EQR01280
      ITO=(IGRC26(IUNIT)-(IGRC26(IUNIT)/10000)*10000)/100                EQR01290
C     IF FUTURE EVENTS CALENDER CONTAINS EQUIPMENT COMPLETION EVENT ON   EQR01300
C     SAME SYSTEM - RETURN                                               EQR01310
      CALL CKEVNT(IFROM,ITO,3,ISYSNO,IRESLT)                             EQR01320
      IF(IRESLT)702,702,400                                              EQR01330
  702 CALL OP26(IFROM,ITO,ISYSNO)                                        EQR01340
      GO TO 400                                                          EQR01350
C                                                                        EQR01360
C     GENERATOR                                                          EQR01370
    4 IFROM=(IGEN(IUNIT)-(IGEN(IUNIT)/10000)*10000)/100                  EQR01380
C     DETERMINE ARRAY SUBSCRIPTS FOR PRINTOUT                            EQR01390
      IF(LOCSIT(IFROM)/1000000-22)950,950,951                            EQR01400
  951 NUM2=3*23-2                                                        EQR01410
      GO TO 952                                                          EQR01420
  950 NUM2=3*(LOCSIT(IFROM)/1000000)-2                                   EQR01430
C     WRITE PLAYER MESSAGE                                               EQR01440
  952 WRITE(6,953)IUNIT,HQ(NUM2),HQ(NUM2+1),HQ(NUM2+2),IFROM             EQR01450
  953 FORMAT(/17H EQUIPMENT REPAIR/5X,16HGENERATOR NUMBER,I3,            EQR01460
     1 12H LOCATED AT ,3A4,6H (SITE,I3,1H)/5X,18HHAS BEEN REPAIRED.)     EQR01470
C     CHANGE FLAG ON GENERATOR                                           EQR01480
      IGEN(IUNIT)=IGEN(IUNIT)-10                                         EQR01490
C     SCHEDULE NEXT FAILURE TIME FOR GENERATOR                           EQR01500
  981 CALL GAUSS(IX,2880.,5760.,FAIL)                                    EQR01510
      IF(FAIL)981,982,982                                                EQR01520
  982 IFAIL=FAIL                                                         EQR01530
      IGENFL(IUNIT)=IFAIL+ITIME                                          EQR01540
C                                                                        EQR01550
  400 RETURN                                                             EQR01560
      END                                                                EQR01570


      SUBROUTINE OP50(IFROM,ITO,ISYSNO,IUNIT)                            OP5CCC10
C                                                                        OP5CC020
C     THIS SUBROUTINE DETERMINES IF OPERATIONAL AN/GRC-50 (IUNIT) WILL   OP5CCC30
C     ENABLE THE NON-OPERATIONAL RR SYSTEM TO WORK                       OP5CC040
C                                                                        OP5CCC5C
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),       OP5CCC60
     1IGRC50(14C),ITCC7(56),IGRC25(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),OP5CCC70
     2IDUM1(3C),IGEN(54),LCCHQ(22)                                       OP5CCC8C
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C                                                                       OP5CCC9C
      J=ISYSNO*100+IFROM                                                OP5CC1C0
      DO 402 I=1,140                                                    OP5CC11C
C     IS RADIO ON RR SYSTEM?                                            OP5CC120
      IF(IGRC5C(I)-(IGRC5C(I)/10)*10-2)402,403,402                      OP5CC13C
C     IS SYSTEM AND SITE NUMBER CORRECT?                                OP5CC140
  403 IF((IGRC5C(I)-(IGRC5C(I)/100000)*100000)/100-J)402,404,402        OP5CC150
C     IS RADIO OPERATIONAL?                                             OP5CC160
  404 IF((IGRC5C(I)-(IGRC5C(I)/100)*100)/10)406,406,400                 OP5CC170
  402 CONTINUE                                                          OP5CC180
      GO TO 4CC                                                         OP5CC19C
  406 IF(LOCSIT(ITO)/1000000-22)670,670,656                             OP5002CC
  67C DO 407 K=1,56                                                     OP5CC21C
C     IS TCC-7 ON RR SYSTEM?                                            OP5CC22C
      IF(ITCC7(K)-(ITCC7(K)/10)*10-2)407,408,407                        OP5CC23C
C     IS SYSTEM AND SITE NUMBER CORRECT?                                OP5CC240
  408 IF((ITCC7(K)-(ITCC7(K)/100000)*100000)/100-J)407,409,407          OP5CC250
C     IS MULTIPLEX OPERATIONAL?                                         OP5CC260
  409 IF((ITCC7(K)-(ITCC7(K)/100)*100)/10)656,656,400                   OP5CC27C
  407 CONTINUE                                                          OP5CC280
      GO TO 4CC                                                         OP5CC29C
  656 IF(LOCSIT(IFROM)/1000000-22)655,655,410                           OP5003C0
  655 JJ=ISYSNO*100+ITO                                                 OP5CC310
      DO 65C KK=1,56                                                    OP5CC32C
      IF(ITCC7(KK)-(ITCC7(KK)/10)*10-2)650,651,650                      OP5CC330
  651 IF((ITCC7(KK)-(ITCC7(KK)/100000)*100000)/100-JJ)650,652,650       OP5CC340
  652 IF((ITCC7(KK)-(ITCC7(KK)/100)*100)/10)410,410,400                 OP5CC35C
  65C CONTINUE                                                          OP5CC360
      GO TO 4CC                                                         OP5CC37C
C     CHANGE FLAG ON SYSTEM TO OPERATIONAL                              OP5CC380
  41C CALL SYSOP(IRRSYS,ISYSNO,IFROM,ITO,NUM4,50,K,KK,I)                OP5CC390
      IRRSYS(I)=IRRSYS(I)-1                                             OP5004CC
C     WRITE PLAYER MESSAGE                                              OP5CC41C
      WRITE(6,411)ISYSNO,K,KK                                           OP5CC42C
  411 FORMAT(/26H RADIO RELAY SYSTEM NUMBER,I2,10H FROM SITE,I3,        OP5CC43C
     1 18H TO SITE,I3,18H IS NOW OPERATING.)                            OP5CC44C
C                                                                       OP5CC45C
  400 RETURN                                                            OP5CC46C
      END                                                               OP5CC47C


      SUBROUTINE OP7(IFROM,ITO,ISYSNO,ISYSTP,IUNIT)                     OP7CCC1C
C                                                                       OP7CC020
C     THIS SUBROUTINE DETERMINES IF OPERATIONAL AN/TCC-7 (IUNIT) WILL   OP7CC03C
C     ENABLE THE NON-OPERATIONAL RR OR CBL SYSTEM TO WORK               OP7CC040
C                                                                       OP7CCC5C
      DOUBLE PRECISION VEHID,EQUIP                                      OP7CC060
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      OP7CCC70
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     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IFFSYS(20),ICBSYS(10),OP7CC080
     2IDUM1(30),IGEN(54),LOCHQ(22)                                        OP7000S0
C                                                                         OP7CC1C0
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(69)              OP7CC110
      J=ISYSNO*100+IFROM                                                  OP7CC120
C     CHOOSE EITHER RR OR CBL SYSTEM                                      OP7CC130
      IF(ISYSTP-1)706,706,603                                             OP700140
C     RR SYSTEM                                                           OP7CC150
  603 DO 702 I=1,140                                                      OP7CC160
      IF(IGRC50(I)-(IGRC50(I)/10)*10-2)702,703,702                        OP7CC170
  703 IF((IGRC50(I)-(IGRC50(I)/100000)*100000)/100-J)702,704,702          OP7CC180
  704 IF((IGRC50(I)-(IGRC50(I)/100)*100)/10)756,756,400                   OP7CC190
  702 CONTINUE                                                            OP7CC2C0
      GO TO 4CC                                                           OP7CC210
  756 JJ=ISYSNO*100+ITO                                                   OP7CC220
      DO 850 IJ=1,140                                                     OP7CC23C
      IF(IGRC50(IJ)-(IGRC50(IJ)/10)*10-2)850,758,850                      OP7CC240
  758 IF((IGRC50(IJ)-(IGRC50(IJ)/100000)*100000)/100-JJ)850,759,850       OP7CC250
  759 IF((IGRC50(IJ)-(IGRC50(IJ)/100)*100)/10)706,706,400                 OP7CC260
  850 CONTINUE                                                            OP7CC270
      GO TO 4CC                                                           OP7CC280
C     CBL SYSTEM AND RR SYSTEM                                            OP7CC290
  706 IF(LOCSIT(ITO)/1CC0000-22)975,975,710                               OP7CC3C0
  975 DO 707 K=1,56                                                       OP7CC310
      IF(ITCC7(K)-(ITCC7(K)/10)*10-ISYSTP)707,708,707                     OP7CC320
  708 IF((ITCC7(K)-(ITCC7(K)/100000)*100000)/100-J)707,709,707            OP7CC330
  709 IF((ITCC7(K)-(ITCC7(K)/100)*100)/10)710,710,400                     OP7CC340
  707 CONTINUE                                                            OP7CC35C
      GO TO 4CC                                                           OP7CC360
C     CHANGE FLAG ON SYSTEM TO OPERATIONAL                                OP7CC370
  710 IF(ISYSTP-1)750,750,751                                             OP7CC380
  751 CALL SYSOP(IRRSYS,ISYSNO,IFROM,ITO,NUM4,50,K,KK,I)                  OP7CC390
      IRRSYS(I)=IRRSYS(I)-1                                               OP7CC4C0
      GO TO 752                                                           OP7CC410
  750 CALL SYSOP(ICBSYS,ISYSNO,IFROM,ITO,NUM4,K,KK,I)                     OP7CC42C
      ICBSYS(I)=ICBSYS(I)-1                                               OP7CC430
C     WRITE PLAYER MESSAGE                                                OP7CC44C
  752 WRITE(6,711)SYSTYP(ISYSTP),ISYSNO,K,KK                              OP7CC450
  711 FORMAT(/A4,14H SYSTEM NUMBER,I2,10H FROM SITE,I3,8H TO SITE,I3,     OP7CC460
     118H IS NOW OPERATING.)                                              OP7CC470
C                                                                         OP7CC480
  400 RETURN                                                              OP7CC490
      END                                                                 OP7CC5C0


      SUBROUTINE OP26(IFROM,ITO,ISYSNO)                                   OP2CC010
C                                                                         OP2CC020
C     THIS SUBROUTINE DETERMINES IF OPERATIONAL AN/GRC-26 WILL ENABLE     OP2CC030
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C      NON-OPERATIONAL H-F SYSTEM TO WORK                                    OP2C0040
C                                                                            OP2CC050
       COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),          OP2CC060
      1IGRC50(14C),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),OP2CC070
      2IDUM1(3C),IGEN(54),LCCHQ(22)                                          OP2CC080
C                                                                            OP2CC090
       J=ISYSNC*100+IFRCM                                                    OP2CC1CC
       DO 902 I=1,21                                                         OP2CC11C
C      IS RADIO ON H-F SYSTEM?                                               OP2CC120
       IF(IGRC26(I)-(IGRC26(I)/10)*10-3)902,903,902                          OP2CC130
C      IS SYSTEM AND SITE NUMBER CORRECT                                     OP2CC140
  903  IF((IGRC26(I)-(IGRC26(I)/100000)*100000)/100-J)902,904,902            OP2CC15C
C      IS RADIO OPERATIONAL?                                                 OP2CC160
  904  IF((IGRC26(I)-(IGRC26(I)/100)*100)/10)906,906,400                     OP2CC170
  902  CONTINUE                                                              OP2CC180
       GO TO 400                                                             OP2CC19C
C      CHANGE FLAG ON SYSTEM TO OPERATIONAL                                  OP2CC2CC
  906  CALL SYSOP(IHFSYS,ISYSNC,IFRCM,ITC,NUM4,20,K,KK,I)                    OP2CC21C
       IHFSYS(I)=IHFSYS(I)-1                                                 OP2CC220
C      WRITE PLAYER MESSAGE                                                  OP2CC23C
       WRITE(6,911)ISYSNO,K,KK                                               OP2CC240
  911  FORMAT(/18H H-F SYSTEM NUMBER,I2,10H FROM SITE,I3,8H TO SITE,I3,      OP2CC250
      118H IS NOW OPERATING.)                                                OP2CC260
C                                                                            OP2CC270
  400  RETURN                                                                OP2CC280
       END                                                                   OP2CC290


       SUBROUTINE VEHBKD(IVEHTP)                                             VEHCCC10
C                                                                            VEHCCC20
CCC    THIS SUBROUTINE DETERMINES THE TIME FOR VEHICLE REPAIR, PRINTS AN     VEHCCC3C
CCC    ESTIMATE FOR THE PLAYERS, AND SCHEDULES REPAIR EVENT                  VEHCCC40
C                                                                            VEHCCC5C
       DOUBLE PRECISION VEHID,EQUIP                                          VEHCCC6C
       COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),          VEHCCC70
      1IGRC50(14C),ITTC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),VEHCCC80
      2IDUM1(3C),IGEN(54),LCCHQ(22)                                          VEHCCC90
       COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(69)                VEHCC1CC
       COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                        VEHCC110
       COMMON/C6/IX                                                          VEHCC120
C                                                                            VEHCC130
CCC    CHANGE VEHICLE DEADLINE PARAMETER, PRINT MESSAGE, DETERMINE IF        VEHCC14C
C      VEHICLE IS IN TRANSIT                                                 VEHCC150
       INUM=IEVCUR-(IEVCUR/1000)*1000                                        VEHCC16C
       GO TO(6,7,8,9,10),IVEHTP                                              VEHCC170
    6  ITC=(IM103(INUM)-(IM103(INUM)/10000)*10000)/100                       VEHCC18C
       IM103(INUM)=IM103(INUM)+10                                            VEHCC190
       ITR=IM103(INUM)-(IM103(INUM)/10)*10                                   VEHCC2CC
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      GO TO 11                                                          VEHOC210
    7 ITO=(IMCC6(INUM)-(IMCC6(INUM)/10000)*10000)/100                   VEHOC220
      IMCC6(INUM)=IMCC6(INUM)+10                                        VEHOC230
      ITR=IMCC6(INUM)-(IMCC6(INUM)/10)*10                               VEHOC240
      GO TO 11                                                          VEHOC250
    8 ITO=(IM102(INUM)-(IM102(INUM)/10000)*10000)/100                   VEHOC260
      IM102(INUM)=IM102(INUM)+10                                        VEHOC270
      ITR=IM102(INUM)-(IM1C2(INUM)/10)*10                               VEHOC280
      GO TO 11                                                          VEHOC290
    9 ITO=(IV26(INUM)-(IV26(INUM)/10000)*10000)/100                     VEHOC300
      IV26(INUM)=IV26(INUM)+10                                          VEHOC310
      ITR=IV26(INUM)-(IV26(INUM)/10)*10                                 VEHOC320
      GO TO 11                                                          VEHOC330
   10 ITO=(IGEN(INUM)-(IGEN(INUM)/10000)*10000)/100                     VEHOC340
      IGEN(INUM)=IGEN(INUM)+10                                          VEHOC350
      ITR=IGEN(INUM)-(IGEN(INUM)/10)*10                                 VEHOC360
      IF(ITR)63,63,62                                                   VEHOC370
   62 WRITE(6,13)INUM,ITO                                               VEHOC380
   13 FORMAT(/17H GENERATOR NUMBER,I3,19H IN TRANSIT TO SITE,I3,        VEHOC390
     117H HAS BROKEN DOWN.)                                             VEHOC400
      GO TO 1                                                           VEHOC410
   63 WRITE(6,64)INUM                                                   VEHOC420
   64 FORMAT(/17H GENERATOR NUMBER,I3,17H HAS BEEN DAMAGED)             VEHOC430
      GO TO 1                                                           VEHOC440
C                                                                       VEHOC450
   11 IF(ITR)5C,50,51                                                   VEHOC460
   51 WRITE(6,12)VEHID(IVEHTP),INUM,ITO                                 VEHOC470
   12 FORMAT(/A9,6HNUMBER,I3,19H IN TRANSIT TO SITE,I3,                 VEHOC480
     117H HAS BROKEN DOWN.)                                             VEHOC490
      GO TO 1                                                           VEHOC500
   5C WRITE(6,53)VEHID(IVEHTP),INUM                                     VEHOC510
   53 FORMAT(/A9,6HNUMBER,I3,17H HAS BEEN DAMAGED)                      VEHOC520
C     CALCULATE TIME FOR REPAIR                                         VEHOC530
    1 CALL GAUSS(IX,90.,180.,REP)                                       VEHOC540
      IF(REP)1,2,2                                                      VEHOC550
    2 IREP=REP                                                          VEHOC560
C     CALCULATE AND PRINT ESTIMATE                                      VEHOC570
    3 CALL GAUSS(IX,REP/3.,REP,EST)                                     VEHOC580
      IF(EST)3,4,4                                                      VEHOC590
    4 IEST=EST                                                          VEHOC600
      IHOUR=C                                                           VEHOC610
  252 IF(IEST-6C)250,251,251                                            VEHOC620
  251 IHOUR=IHOUR+1                                                     VEHOC630
      IEST=IEST-60                                                      VEHOC640
      GO TO 252                                                         VEHOC650
  250 WRITE(6,253)IHOUR,IEST                                            VEHOC660
  253 FORMAT(/5X,24HESTIMATED REPAIR TIME IS,I3,6H HOURS,I3,5H MIN.)    VEHOC670
C     SCHEDULE REPAIR EVENT                                             VEHOC680
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      IEVCAL(100)=60000+IVEHTP*1000+INUM                                VEHCC690
      JEVCAL(100)=ITIME+IREP                                            VEHCC700
      CALL ORDERT                                                       VEHCC710
C                                                                       VEHCC720
      RETURN                                                            VEHCC730
      END                                                               VEHCC740

      SUBROUTINE VEHREP(IVEHTP)                                         VEHCCC10
C                                                                       VEHCCC20
CCC   THIS SUBROUTINE REPAIRS VEHICLES AND SCHECULES ARRIVAL EVENTS     VEHCCC30
C                                                                       VEHCC040
      DOUBLE PRECISION VEHID,EQUIP                                      VEHCCC50
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      VEHC0060
     1IGRC50(140),ITCC7(56),IGPC25(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),VEHCC070
     2IDUM(30),IGEN(54),LOCHQ(22)                                       VEHCC080
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(59)            VEHCCC90
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    VEHCC100
      COMMON/C6/IX                                                      VEHCC110
C                                                                       VEHCC120
CCC   FNND DISTANCE TO DESTINATION, CHANGE VEHICLE DEADLINED PARAMETER, VEHCC130
C     AND DETERMINE DISTANCE TO NEXT BREAKDOWN                          VEHCC140
      INUM=IEVCUR-(IEVCUR/1000)*1000                                    VEHCC150
      GO TO(6,7,8,9,10),IVEHTP                                          VEHCC160
    6 ITO=(IM103(INUM)-(IM103(INUM)/10000)*10000)/100                   VEHCC170
      IDIST=IM103(INUM)/10000                                           VEHCC180
      IM103(INUM)=IM103(INUM)-IDIST*10000                               VEHCC190
   13 CALL GAUSS(IX,100.,200.,BKD)                                      VEHCC200
      IF(BKD)13,13,14                                                   VEHCC210
   14 IBKD=BKD                                                          VEHCC220
      IM103(INUM)=IM103(INUM)+IBKD*10000-10                             VEHCC230
      ITR=IM103(INUM)-(IM103(INUM)/10)*10                               VEHCC240
      GO TO 11                                                          VEHCC250
    7 ITO=(IMCC6(INUM)-(IMCC6(INUM)/10000)*10000)/100                   VEHCC260
      IDIST=IMCC6(INUM)/10000                                           VEHCC270
      IMCC6(INUM)=IMCC6(INUM)-IDIST*10000                               VEHCC280
   15 CALL GAUSS(IX,100.,200.,BKD)                                      VEHCC290
      IF(BKD)15,16,16                                                   VEHCC300
   16 IBKD=BKD                                                          VEHCC310
      IMCC6(INUM)=IMCC6(INUM)+IBKD*10000-10                             VEHCC320
      ITR=IMCC6(INUM)-(IMCC6(INUM)/10)*10                               VEHCC330
      GO TO 11                                                          VEHCC340
    8 ITO=(IM102(INUM)-(IM102(INUM)/10000)*10000)/100                   VEHCC350
      IDIST=IM102(INUM)/10000                                           VEHCC360
      IM102(INUM)=IM102(INUM)-IDIST*10000                               VEHCC370
   17 CALL GAUSS(IX,100.,200.,BKD)                                      VEHCC380
      IF(BKD)17,18,18                                                   VEHCC390
   18 IBKD=BKD                                                          VEHCC400
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      IM102(INUM)=IM102(INUM)+IBKD*10000-10                              VEHCC410
      ITR=IM102(INUM)-(IM102(INUM)/10)*10                                VEHCC420
      GO TO 11                                                           VEHCC430
    9 ITO=(IV26(INUM)-(IV26(INUM)/10000)*10000)/100                      VEHCC440
      IDIST=IV26(INUM)/10000                                             VEHOC450
      IV26(INUM)=IV26(INUM)-IDIST*10000                                  VEHOC460
   19 CALL GAUSS(IX,100.,200.,BKD)                                       VEHCC470
      IF(BKD)19,20,20                                                    VEHOC480
   20 IBKD=BKD                                                           VEHCC490
      IV26(INUM)=IV26(INUM)+IBKD*10000-10                                VEHCC500
      ITR=IV26(INUM)-(IV26(INUM)/10)*10                                  VEHCC510
      GO TO 11                                                           VEHCC520
   10 ITO=(IGEN(INUM)-(IGEN(INUM)/10000)*10000)/100                      VEHCC530
      IDIST=IGEN(INUM)/10000                                             VEHOC540
      IGEN(INUM)=IGEN(INUM)-IDIST*10000                                  VEHCC550
   21 CALL GAUSS(IX,100.,200.,BKD)                                       VEHCC560
      IF(BKD)21,22,22                                                    VEHCC570
   22 IBKD=BKD                                                           VEHOC580
      IGEN(INUM)=IGEN(INUM)+IBKD*10000-10                                VEHOC590
      ITR=IGEN(INUM)-(IGEN(INUM)/10)*10                                  VEHCC600
      IF(ITR)60,60,62                                                    VEHCC610
   60 WRITE(6,61)INUM,ITO                                                VEHCC620
   61 FORMAT(/17H GENERATOR NUMBER,I3,16H LOCATED AT SITE,I3,            VEHCC630
     1 19H HAS BEEN REPAIRED.)                                           VEHCC640
      RETURN                                                             VEHCC650
   11 IF(ITR)50,50,51                                                    VEHCC660
   50 WRITE(6,52)VEHID(IVEHTP),INUM,ITO                                  VEHCC670
   52 FORMAT(/A9,6HNUMBER,I3,16H LOCATED AT SITE,I3,                     VEHCC680
     1 19H HAS BEEN REPAIRED.)                                           VEHCC690
      RETURN                                                             VEHCC700
   62 WRITE(6,23)INUM,ITO                                                VEHCC710
   23 FORMAT(/17H GENERATOR NUMBER,I3,44H HAS BEEN REPAIRED AND IS PROCEVEHCC720
     1EDING TO SITE,I3)                                                  VEHCC730
      GO TO 24                                                           VEHCC740
C                                                                        VEHCC750
C     PRINT MESSAGE                                                      VEHCC760
   51 WRITE(6,1)VEHID(IVEHTP),INUM,ITO                                   VEHCC770
    1 FORMAT(/A9,6HNUMBER,I3,44H HAS BEEN REPAIRED AND IS PROCEEDING TO  VEHCC780
     1SITE,I3)                                                           VEHCC790
C     SCHEDULE ARRIVAL EVENT                                             VEHCC800
   24 ITIME1=IDIST*(60./18.)                                             VEHOC810
      IEVCAL(100)=40000+IVEHTP*1000+INUM                                 VEHOC820
      JEVCAL(100)=ITIME+ITIME1                                           VEHOC830
      CALL ORDERT                                                        VEHOC840
C                                                                        VEHOC850
      RETURN                                                             VEHCC860
      END                                                                VEHCC870

      SUBROUTINE SITACK                                                  SITCCC10
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C                                                                       SITCCC20
C     THIS SUBROUTINE PROCESSES SITE ATTACKS BY CAUSING EQUIPMENT AND   SITCCC30
C     VEHICLES TO FAIL IN ACCORDANCE WITH THE SITE RISK CATAGORY. A NEW SITCCC40
C     ATTACK TIME IS DETERMINED FOR ATTACKED SITE.                      SITCCC50
C                                                                       SITCCC60
      DOUBLE PRECISION VEHID,EQUIP                                      SITCCC70
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      SITCCC80
     1IGRC5C(14C),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),SITCCC90
     2IDUM1(3C),IGEN(54),LCCHQ(22)                                      SITCC1CC
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(69)            SITCC11C
      COMMON/C4/IG50EL(140),IT7EL(56),IG26EL(21),IGENEL(54),ISITEL(30)  SITCC12C
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    SITCC13C
      COMMON/C6/IX                                                      SITCC14C
C                                                                       SITCC15C
C     DETERMINE PROBABILITY OF EQUIPMENT FAILURE AND ESTABLISH NEW SITE SITCC16C
C     ATTACK TIME                                                       SITCC17C
      ISITE=IEVCUR-(IEVCUR/1000)*1000                                   SITCC18C
      ITYPE=LOCSIT(ISITE)/1000000                                       SITCC19C
      IDUM2=3*ITYPE-2                                                   SITCC2CC
      IF(ITYPE.EQ.99)IDUM2=67                                           SITCC21C
      WRITE(6,7C)ISITE,HQ(IDUM2),HQ(IDUM2+1),HQ(IDUM2+2)                SITCC22C
   7C FORMAT(/5H SITE,I3,2H (,3A4,2CH) HAS BEEN ATTACKED.)              SITCC23C
      CALL RANDU(IX,IY,YFL)                                             SITCC24C
      IX=IY                                                             SITCC25C
      IF(ITYPE-3)1,1,2                                                  SITCC26C
    1 PROB=.3                                                           SITCC27C
      ISITEL(ISITE)=YFL*115200.                                         SITCC28C
      GO TO 3                                                           SITCC29C
    2 IF(ITYPE-99)4,5,4                                                 SITCC3CC
    5 PROB=.7                                                           SITCC31C
      ISITEL(ISITE)=YFL*8640C.                                          SITCC32C
      GO TO 3                                                           SITCC33C
    4 PROB=.5                                                           SITCC34C
      ISITEL(ISITE)=YFL*28800.                                          SITCC35C
C                                                                       SITCC36C
C     CHECK EACH MRC-103                                                SITCC37C
    3 DO 6 I=1,32                                                       SITCC38C
C       IS MRC-103 AT SITE?                                             SITCC39C
        IF((IM103(I)-(IM103(I)/10000)*10000)/100-ISITE)6,7,6            SITCC4CC
C       IS VEH IN TRANSIT?                                              SITCC41C
    7   IF(IM103(I)-(IM103(I)/10)*10)6,12,6                             SITCC42C
C       IS VEH DAMAGED BY ATTACK?                                       SITCC43C
   12   CALL RANDU(IX,IY,YFL)                                           SITCC44C
        IX=IY                                                           SITCC45C
        IF(YFL-PROB)8,9,9                                               SITCC46C
C       IS VEH ALREADY DEADLINED?                                       SITCC47C
    8   IF((IM103(I)-(IM103(I)/100)*100)/10)10,10,9                     SITCC48C
C       CALL BREAKDOWN SUBROUTINE                                       SITCC49C
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   10 IEVCUR=5CCCO+I                                                    SITCC5C0
      CALL VEHBKD(1)                                                    SITCC510
C     CHECK GRC-50'S IN VEH FOR FAILURE                                 SITCC520
    9 IBOT=I*3+42                                                       SITCC530
      ITOP=IBOT+2                                                       SITCC540
      DO 13 J=IBOT,ITOP                                                 SITCC550
C     IS GRC-50 DEADLINED ALREADY?                                      SITCC560
      IF((IGRC5C(J)-(IGRC5C(J)/100)*100)/10)15,15,13                    SITCC570
C     IS RADIO DAMAGED BY ATTACK                                        SITCC58C
   15 CALL RANDU(IX,IY,YFL)                                             SITCC59C
      IX=IY                                                             SITCC60C
      IF(YFL-PROB)14,13,13                                              SITCC61C
   14 IEVCUR=11000+J                                                    SITCC62C
      CALL EQFAIL                                                       SITCC63C
   13 CONTINUE                                                          SITCC64C
    6 CONTINUE                                                          SITCC650
C                                                                       SITCC66C
C     MCC-6                                                             SITCC67C
C     SAME COMMENTS AS IN MRC-103 APPLY                                 SITCC68C
      DO 16 I=1,17                                                      SITCC69C
      IF((IMCC6(I)-(IMCC6(I)/10000)*10000)/100-ISITE)16,17,16           SITCC7CC
   17 IF(IMCC6(I)-(IMCC6(I)/10)*10)16,22,16                             SITCC710
   22 CALL RANDU(IX,IY,YFL)                                             SITCC720
      IX=IY                                                             SITCC730
      IF(YFL-PROB)18,19,19                                              SITCC74C
   18 IF((IMCC6(I)-(IMCC6(I)/100)*100)/10)20,20,19                      SITCC750
   20 IEVCUR=5CCCO+I                                                    SITCC760
      CALL VEHBKD(2)                                                    SITCC770
   19 IBOT=I*2+21                                                       SITCC78C
      ITOP=IBOT+1                                                       SITCC79C
      DO 23 J=IBOT,ITOP                                                 SITCC8CC
      IF((ITCC7(J)-(ITCC7(J)/100)*100)/10)25,25,13                      SITCC810
   25 CALL RANDU(IX,IY,YFL)                                             SITCC820
      IX=IY                                                             SITCC830
      IF(YFL-PROB)24,23,23                                              SITCC84C
   24 IEVCUR=12CCO+J                                                    SITCC850
      CALL EQFAIL                                                       SITCC860
   23 CONTINUE                                                          SITCC87C
   16 CONTINUE                                                          SITCC88C
C                                                                       SITCC89C
C     MRC-102                                                           SITCC9CC
      DO 26 I=1,22                                                      SITCC910
      IF((IM1C2(I)-(IM102(I)/10000)*10000)/100-ISITE)26,27,26           SITCC92C
   27 IF(IM102(I)-(IM102(I)/10)*10)26,32,26                             SITCC930
   32 CALL RANDU(IX,IY,YFL)                                             SITCC940
      IX=IY                                                             SITCC950
      IF(YFL-PROB)28,29,29                                              SITCC960
   28 IF((IM102(I)-(IM102(I)/100)*100)/10)30,30,29                      SITCC970
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   30 IEVCUR=5CCCO+I                                                    SITCC980
      CALL VEHBKD(3)                                                    SITOC990
   29 IBOT=I*2-1                                                        SITC1CCC
      ITOP=IBOT+1                                                       SITC1010
      DO 33 J=IBOT,ITOP                                                 SITO1C20
      IF((IGRC50(I)-(IGRC50(I)/100)*100)/10)35,35,33                    SITO1030
   35 CALL RANDU(IX,IY,YFL)                                             SITC1040
      IX=IY                                                             SITO1050
      IF(YFL-PROB)34,33,33                                              SITC1060
   34 IEVCUR=11000+J                                                    SITO1C70
      CALL EQFAIL                                                       SITC1C8C
   33 CONTINUE                                                          SITC1C9C
      IF((ITCC7(I)-(ITCC7(I)/100)*100)/10)85,85,26                      SITC11CO
   85 CALL RANDU(IX,IY,YFL)                                             SITO1110
      IX=IY                                                             SITC1120
      IF(YFL-PROB)84,26,26                                              SITC1130
   84 IEVCUR=12CCO+I                                                    SITC1140
      CALL EQFAIL                                                       SITC1150
   26 CONTINUE                                                          SITC1160
C                                                                       SITC1170
C     GRC-26                                                            SITC1180
      DO 36 I=1,21                                                      SITC1190
      IF((IV26(I)-(IV26(I)/10000)*10000)/100-ISITE)36,37,36             SITC12CC
   37 IF(IV26(I)-(IV26(I)/10)*10)36,42,36                               SITO1210
   42 CALL RANDU(IX,IY,YFL)                                             SITC1220
      IX=IY                                                             SITO1230
      IF(YFL-PROB)38,39,39                                              SITC1240
   38 IF((IV26(I)-(IV26(I)/100)*100)/10)40,40,39                        SITO1250
   40 IEVCUR=5CCOO+I                                                    SITC1260
      CALL VEHBKD(4)                                                    SITC1270
   39 IF((IGRC26(I)-(IGRC26(I)/100)*100)/10)45,45,36                    SITO1280
   45 CALL RANDU(IX,IY,YFL)                                             SITC1290
      IX=IY                                                             SITC1300
      IF(YFL-PROB)44,36,36                                              SITO1310
   44 IEVCUR=14CCO+I                                                    SITC132C
      CALL EQFAIL                                                       SITC133C
   36 CONTINUE                                                          SITC1340
C                                                                       SITO1350
C     GENERATORS                                                        SITO1360
      DO 56 I=1,54                                                      SITO1370
      IF((IGEN(I)-(IGEN(I)/10000)*10000)/100-ISITE)56,57,56             SITC138C
   57 IF(IGEN(I)-(IGEN(I)/10)*10)56,62,56                               SITO139C
   62 CALL RANDU(IX,IY,YFL)                                             SITO14CC
      IX=IY                                                             SITO1410
      IF(YFL-PROB)58,56,56                                              SITC142C
   58 IF((IGEN(I)-(IGEN(I)/100)*100)/10)60,60,56                        SITO1430
   60 IEVCUR=5COOO+I                                                    SITC144C
      CALL VEHBKD(5)                                                    SITC1450
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   56 CONTINUE                                                          SITC146C
C                                                                       SITC1470
      RETURN                                                            SITC1480
      END                                                               SITC1490

      SUBROUTINE EQREM(ITYPE)                                           EQRCC010
C                                                                       EQRCC020
CC    THIS SUBROUTINE REMOVES EQUIPMENT FROM A SYSTEM ON PLAYERS REQUEST EQRCCC30
C                                                                       EQRCC040
      DOUBLE PRECISION VEHID,EQUIP                                      EQRCC050
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      EQRCC060
     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),EQRCCC70
     2IDUM1(30),IGEN(54),LCCHQ(22)                                      EQRCCC80
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(69)            EQRCCC90
      COMMON/C4/IG50FL(140),IT7FL(56),IG26FL(21),IGENFL(54)             EQRCC100
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    EQRCC110
C                                                                       EQRCC120
      NUM4=0                                                            EQRCC130
      GO TO(1,2,3),ITYPE                                                EQRCC140
C                                                                       EQRCC150
CC    GRC-50                                                            EQRCC160
C     PRINT MESSAGE AND RECEIVE DATA                                    EQRCC170
    1 WRITE(6,10)EQUIP(1)                                               EQRCC180
   10 FORMAT(/8H REMOVE ,A8,11HFROM SYSTEM//28H SITE NO, SYSTEM NO, TO SEQRCC190
     1ITE/8H XX X XX)                                                   EQRCC200
      READ(5,11)ISITE1,ISYSNO,ISITE2                                    EQRCC210
   11 FORMAT(2I2,I3)                                                    EQRCC220
      WRITE(6,12)ISITE1,ISYSNO,ISITE2                                   EQRCC230
   12 FORMAT(I3,I2,I3)                                                  EQRCC240
C     DOES SYSTEM EXIST AT SITE?                                        EQRCC250
      CALL SYSOP(IRRSYS,ISYSNO,ISITE1,ISITE2,NUM4,50,IFROM,ITO,II)      EQRCC260
      IF(NUM4-3)13,14,14                                                EQRCC270
   14 WRITE(6,15)                                                       EQRCC280
   15 FORMAT(/22H SYSTEM DOES NOT EXIST)                                EQRCC290
      GO TO 100                                                         EQRCC300
C     IS GRC-50 CONNECTED TO SYSTEM                                     EQRCC310
   13 J=ISYSNO*100+ISITE2                                               EQRCC320
      DO 16 I=1,140                                                     EQRCC330
      IF((IGRC50(I)-(IGRC50(I)/100000)*100000)/100-J)16,17,16           EQRCC340
   17 IVEHNO=(IGRC50(I)-(IGRC50(I)/10000000)*10000000)/100000           EQRCC350
      IVEHTP=IGRC50(I)/10000000                                         EQRCC360
      IF(IVEHTP-1)19,19,20                                              EQRCC370
   19 NUM2=3                                                            EQRCC380
      IF((IM102(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100-ISITE1)16,21,16EQRCC390
   20 NUM2=1                                                            EQRCC400
      IF((IM103(IVEHNO)-(IM103(IVEHNO)/10000)*10000)/100-ISITE1)16,21,16EQRCC410
   16 CONTINUE                                                          EQRCC420
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      60 WRITE(6,18)EQUIP(ITYPE),ISITE1                                 EQRCC430
      18 FORMAT(/4H NO ,A8,28HCONNECTED TO SYSTEM AT SITE ,I2)          EQRCC440
         GO TO 100                                                      EQRCC450
      21 ISYSTP=2                                                       EQRCC460
C        REMOVE GRC-50 FROM SYSTEM                                      EQRCC470
         IGRC50(I)=IGRC50(I)-J*100                                      EQRCC480
         WRITE(6,22)EQUIP(ITYPE),VEHID(NUM2),IVEHNO,ISITE1,SYSTYP(ISYSTP),EQRCC490
        1ISYSNO,IFROM,ITO                                               EQRCC500
      22 FORMAT(/A9,3HIN ,A8,6HNUMBER,I3,8H AT SITE,I3,22H HAS BEEN REMOVEDEQRCC510
        1 FROM,A4/14H SYSTEM NUMBER,I2,10H FROM SITE,I3,8H TO SITE,I3,1H.) EQRCC520
C        IF FAILURE IS IN FUTURE EVENTS TABLE REMOVE IT                 EQRCC530
         DO 90 K=1,100                                                  EQRCC540
         IF(IEVCAL(K)-(11000+I))90,91,90                                EQRCC550
      91 IG50FL(I)=JEVCAL(K)-ITIME                                      EQRCC560
         DO 92 L=K,99                                                   EQRCC570
         IEVCAL(L)=IEVCAL(L+1)                                          EQRCC580
      92 JEVCAL(L)=JEVCAL(L+1)                                          EQRCC590
         IEVCAL(100)=0                                                  EQRCC600
         JEVCAL(100)=0                                                  EQRCC610
      90 CONTINUE                                                       EQRCC620
C        DOES THIS MAKE SYSTEM NON-OPERATIVE?                           EQRCC630
      36 IF(IRRSYS(II)-(IRRSYS(II)/10)*10)23,23,100                     EQRCC640
C        CHANGE SYSTEM STATUS                                           EQRCC650
      23 IRRSYS(II)=IRRSYS(II)+1                                        EQRCC660
      38 WRITE(6,24)SYSTYP(ISYSTP),ISYSNO,IFROM,ITO                     EQRCC670
      24 FORMAT(/A5,13HSYSTEM NUMBER,I2,10H FROM SITE,I3,8H TO SITE,I3, EQRCC680
        124H IS NOW NON-OPERATIONAL.)                                   EQRCC690
         GO TO 100                                                      EQRCC700
C                                                                       EQRCC710
CC       TCC-7                                                          EQRCC720
C        PRINT MESSAGE AND RECEIVE DATA                                 EQRCC730
       2 WRITE(6,25)                                                    EQRCC740
      25 FORMAT(/25H REMOVE TCC-7 FROM SYSTEM/59H SITE NO, SYSTEM NO, TO SIEQRCC750
        1TE, SYSTEM TYPE (1 = CRL, 2 = RR)/10H XX X XX X)               EQRCC760
         READ(5,26)ISITE1,ISYSNO,ISITE2,ISYSTP                          EQRCC770
      26 FORMAT(2I2,I3,I2)                                              EQRCC780
         WRITE(6,27)ISITE1,ISYSNO,ISITE2,ISYSTP                         EQRCC790
      27 FORMAT(I3,I2,I3,I2)                                            EQRCC800
C        DOES SYSTEM EXIST AT SITE                                      EQRCC810
         GO TO(29,28),ISYSTP                                            EQRCC820
      28 CALL SYSOP(IRRSYS,ISYSNO,ISITE1,ISITE2,NUM4,50,IFROM,ITO,II)   EQRCC830
         GO TO 50                                                       EQRCC840
      29 CALL SYSOP(ICBSYS,ISYSNO,ISITE1,ISITE2,NUM4,10,IFROM,ITO,II)   EQRCC850
      50 IF(NUM4-3)51,14,14                                             EQRCC860
C        IS TCC-7 CONNECTED TO SYSTEM?                                  EQRCC870
      51 J=ISYSNO*100+ISITE2                                            EQRCC880
         DO 30 I=1,50                                                   EQRCC890
         IF((ITCC7(I)-(ITCC7(I)/100000)*100000)/100-J)30,31,30          EQRCC900
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   31 IVEHNO=(ITCC7(I)-(ITCC7(I)/10000000)*10000000)/100000                EQR0C910
      IVEHTP=ITCC7(I)/10000000                                             EQR0C920
      IF(IVEHTP-1)32,32,33                                                 EQR0C930
   32 NUM2=3                                                               EQR0C940
      IF((IM102(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100-ISITE1)30,34,3CEQR0C950
   33 NUM2=2                                                               EQR0C960
      IF((IMCC6(IVEHNO)-(IMCC6(IVEHNO)/10000)*10000)/100-ISITE1)30,34,3CEQR0C97C
   30 CONTINUE                                                             EQR0C980
      GO TO 6C                                                             EQR0C990
C     REMOVE TCC-7 FROM SYSTEM                                             EQR01000
   34 ITCC7(I)=ITCC7(I)-J*100                                              EQR01010
      WRITE(6,22)EQUIP(ITYPE),VEHID(NUM2),IVEHNO,ISITE1,SYSTYP(ISYSTP),    EQR01C20
     1ISYSNO,IFROM,ITO                                                     EQR01C30
C     IF FAILURE IS IN FUTURE EVENTS TABLE REMOVE IT                       EQR01C40
      DO 93 K=1,100                                                        EQR01050
      IF(IEVCAL(K)-(12000+I))93,94,93                                      EQR01060
   94 IT7FL(I)=JEVCAL(K)-ITIME                                             EQR01070
      DO 95 L=K,99                                                         EQR01C80
      IEVCAL(L)=IEVCAL(L+1)                                                EQR01090
   95 JEVCAL(L)=JEVCAL(L+1)                                                EQR01100
      IEVCAL(100)=0                                                        EQR01110
      JEVCAL(10C)=0                                                        EQR01120
   93 CONTINUE                                                             EQR01130
C     DOES THIS MAKE SYSTEM NON-OPERATIVE?                                 EQR01140
      GO TO(35,36),ISYSTP                                                  EQR01150
   35 IF(ICBSYS(II)-(ICBSYS(II)/10)*10)37,37,100                           EQR01160
   37 ICBSYS(II)=ICBSYS(II)+1                                              EQR01170
      GO TO 38                                                             EQR0C118C
C                                                                          EQR01190
CC    GRC-26                                                               EQR01200
C     PRINT MESSAGE AND RECEIVE DATA                                       EQR01210
    3 WRITE(6,10)EQUIP(3)                                                  EQR01220
      READ(5,11)ISITE1,ISYSNC,ISITE2                                       EQR01230
      WRITE(6,12)ISITE1,ISYSNO,ISITE2                                      EQR01240
C     DOES SYSTEM EXIST AT SITE                                            EQR01250
      CALL SYSOP(IHFSYS,ISYSNO,ISITE1,ISITE2,NUM4,20,IFROM,ITO,II)         EQR01260
      IF(NUM4-3)39,14,14                                                   EQR01270
C     IS GRC-26 CONNECTED TC SYSTEM                                        EQR0128C
   39 J=ISYSNO*100+ISITE2                                                  EQR01290
      DO 41 I=1,21                                                         EQR01300
      IF((IGRC26(I)-(IGRC26(I)/100000)*100000)/100-J)41,80,41              EQR01310
   80 IF((IV26(I)-(IV26(I)/10000)*10000)/100-ISITE1)41,42,41               EQR01320
   41 CONTINUE                                                             EQR01330
      GO TO 60                                                             EQR01340
C     REMOVE GRC-26 FROM SYSTEM                                            EQR01350
   42 IGRC26(I)=IGRC26(I)-J*100                                            EQR01360
      WRITE(6,22)EQUIP(ITYPE),VEHID(4),I,ISITE1,SYSTYP(ITYPE),ISYSNO,      EQR0137C
     1IFROM,ITO                                                            EQR01380
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C       IF FAILURE EXISTS IN FUTURE EVENTS TABLE REMOVE IT                EQRC1390
        DO 96 K=1,100                                                     EQRC1400
        IF(IEVCAL(K)-(1300C+I))96,97,96                                   EQRC1410
   97   IG26FL(I)=JEVCAL(K)-ITIME                                         EQRC1420
        DO 98 L=K,99                                                      EQRC1430
        IEVCAL(L)=IEVCAL(L+1)                                             EQRC1440
   98   JEVCAL(L)=JEVCAL(L+1)                                             EQRC1450
        IEVCAL(100)=0                                                     EQRC1460
        JEVCAL(100)=0                                                     EQRC1470
   96   CONTINUE                                                          EQRC1480
C       DOES THIS MAKE SYSTEM NON-OPERATIVE?                              EQRC1490
        IF(IHFSYS(II)-(IHFSYS(II)/10)*10)43,43,100                        EQRC1500
C       CHANGE SYSTEM STATUS                                              EQRC1510
   43   IHFSYS(II)=IHFSYS(II)+1                                           EQRC1520
        WRITE(6,24)SYSTYP(ITYPE),ISYSNO,IFROM,ITO                         EQRC1530
C                                                                         EQRC1540
  100   RETURN                                                            EQRC1550
        END                                                               EQRC1560


        SUBROUTINE EQINST(NUMB)                                           EQICCC10
C                                                                         EQIOC020
CC      THIS SUBROUTINE SCHEDULES INSTALLATION EVENTS AND INSTALLS EQUIP- EQICCC30
CC      MENT ON PLAYERS REQUEST                                           EQIOC040
C                                                                         EQICCC50
        DOUBLE PRECISION VEHID,EQUIP                                      EQICC06C
        COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      EQICCC70
       1IGRC50(14C),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),EQICCC80
       2IDUM1(3C),IGEN(54),LCCHQ(22)                                      EQIOCC90
        COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(69)            EQICC1CO
        COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    EQICC110
        COMMON/C6/IX                                                      EQICC120
C                                                                         EQICC130
        NUM4=C                                                            EQICC140
        GO TO (1,2,3,4,4,4),NUMB                                          EQIOC150
C                                                                         EQICC160
CC      GRC-50                                                            EQICC17C
C       WRITE MESSAGE AND RECEIVE INPUT                                   EQICC18C
    1   WRITE(6,7)EQUIP(1)                                                EQIGC19C
    7   FORMAT(/9H INSTALL ,A8,10H ON SYSTEM//69H SITE NO, VEH TYPE (1=MRCEQICC2CC
       1-103, 2=MRC-102), VEH NO, SYSTEM NO, TO SITE/13H XX X XX X XX)    EQIOC21C
        READ(5,8)ISITE1,IVEH,IVEHNO,ISYSNO,ISITE2                         EQICC22C
    8   FORMAT(2I2,I3,I2,I3)                                              EQIOC230
        WRITE(6,9)ISITE1,IVEH,IVEHNO,ISYSNO,ISITE2                        EQIOC240
    9   FORMAT(I3,I2,I3,I2,I3)                                            EQICC25C
C       IS VEHICLE AT SITE OR IN TRANSIT?                                 EQICC26C
        ISYSTP=2                                                          EQICC27C
        GO TO(10,11),IVEH                                                 EQICC28C
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C       MRC-103                                                                 EQIOC290
   10   NUM2=1                                                                  EQIOC300
        IF((IM103(IVEHNO)-(IM103(IVEHNO)/10000)*10000)/100-ISITE1)12,13,12      EQIOC310
   13   IF(IM103(IVEHNO)-(IM103(IVEHNO)/10)*10)15,15,16                         EQIOC320
   12   WRITE(6,14)VEHID(NUM2),IVEHNO,ISITE1                                    EQIOC330
   14   FORMAT(/A9,6HNUMBER,I3,23H IS NOT LOCATED AT SITE,I3)                   EQIOC340
        GO TO 100                                                               EQIOC350
   16   WRITE(6,17)VEHID(NUM2),IVEHNO                                           EQIOC360
   17   FORMAT(/A9,6HNUMBER,I3,14H IS IN TRANSIT)                               EQIOC370
        GO TO 100                                                               EQIOC380
C       MRC-102                                                                 EQIOC390
   11   NUM2=3                                                                  EQIOC400
        IF((IM102(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100-ISITE1)12,18,12      EQIOC410
   18   IF(IM102(IVEHNO)-(IM102(IVEHNO)/10)*10)15,15,16                         EQIOC420
C       DOES SYSTEM EXIST AT SITE?                                              EQIOC430
   15   CALL SYSOP(IRRSYS,ISYSNO,ISITE1,ISITE2,NUM4,50,IFROM,ITO,II)            EQIOC440
        IF(NUM4-3)19,20,20                                                      EQIOC450
   20   WRITE(6,21)                                                             EQIOC460
   21   FORMAT(/22H SYSTEM DOES NOT EXIST)                                      EQIOC470
        GO TO 100                                                               EQIOC480
C       IS EQUIP CONNECTED TO SYSTEM ALREADY?                                   EQIOC490
   19   J=ISYSNO*100+ISITE2                                                     EQIOC500
        DO 22 I=1,140                                                           EQIOC510
        IF((IGRC50(I)-(IGRC50(I)/100000)*100000)/100-J)22,23,22                 EQIOC520
   23   IVEHNU=(IGRC50(I)-(IGRC50(I)/10000000)*10000000)/100000                 EQIOC530
        IVEHTP=IGRC50(I)/10000000                                               EQIOC540
        IF(IVEHTP-1)24,24,25                                                    EQIOC550
   24   NUM5=3                                                                  EQIOC560
        IF((IM102(IVEHNU)-(IM102(IVEHNU)/10000)*10000)/100-ISITE1)22,26,22      EQIOC570
   25   NUM5=1                                                                  EQIOC580
        IF((IM103(IVEHNU)-(IM103(IVEHNU)/10000)*10000)/100-ISITE1)22,26,22      EQIOC590
   26   WRITE(6,27)EQUIP(NUMB),VEHID(NUM5),IVEHNU                               EQIOC600
   27   FORMAT(/A9,2HIN,A9,6HNUMBER,I3,31H IS ALREADY CONNECTED TO SYSTEM)      EQIOC610
        GO TO 100                                                               EQIOC620
   22   CONTINUE                                                                EQIOC630
C       IS GRC-50 AVAILABLE AND OPERATIONAL?                                    EQIOC640
        GO TO(28,29),IVEH                                                       EQIOC650
C       MRC-103                                                                 EQIOC660
   28   IBOT=42+IVEHNO*3                                                        EQIOC670
        ITOP=IBOT+2                                                             EQIOC680
        GO TO 30                                                                EQIOC690
C       MRC-102                                                                 EQIOC700
   29   IBOT=IVEHNO*2-1                                                         EQIOC710
        ITOP=IBOT+1                                                             EQIOC720
   30   DO 31 K=IBOT,ITOP                                                       EQIOC730
        IF((IGRC50(K)-(IGRC50(K)/100000)*100000)/100)33,33,31                   EQIOC740
   31   CONTINUE                                                                EQIOC750
   71   WRITE(6,34)EQUIP(NUMB)                                                  EQIOC760
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   34 FORMAT(/11H NO UNUSED ,A7,11H IN VEHICLE)                                    EQICC77C
      GO TO 10C                                                                    EQICC78C
   33 IF((IGRC5C(K)-(IGRC5C(K)/100)*100)/10)35,35,36                               EQICC79C
   36 IF(K-ITOP)37,38,38                                                           EQICC80C
   37 IBOT=K+1                                                                     EQICC81C
      GO TO 3C                                                                     EQICC82C
   38 WRITE(6,39)EQUIP(NUMB)                                                       EQICC83C
   39 FORMAT(/11H NO UNUSED ,A7,34H WHICH IS NOT DEACLINED IN VEHICLE)             EQICC84C
      GO TO 10C                                                                    EQICC85C
C     SCHEDULE INSTALLATICN EVENT AND CHANGE GRC-50 UNIT TO REFLECT               EQICC86C
C     INSTALLATION                                                                 EQICC87C
   35 IEVCAL(1CC)=3100C+K                                                          EQICC88C
      IGRC50(K)=(IGRC5C(K)/10)*10+100*J+2                                          EQICC89C
   93 CALL GAUSS(IX,5.,15.,TIME1)                                                  EQICC9CC
      IF(TIME1)93,78,78                                                            EQICC91C
   78 ITIME1=TIME1                                                                 EQICC92C
      JEVCAL(1CC)=ITIME+ITIME1                                                     EQICC93C
      CALL ORDERT                                                                  EQICC94C
C     PRINT MESSAGE                                                               EQICC95C
      WRITE(6,40)EQUIP(NUMB),VEHID(NUM2),IVEHNO,ISITE1,SYSTYP(ISYSTP),            EQICC96C
     1IFROM,ITO                                                                    EQICC97C
   40 FORMAT(/16H INSTALLATICN OF,A9,3HIN ,A8,2HNO,I3,16H LOCATED AT SITEQICC98C
     1E,I3/12H HAS BEGUN. ,A4,2OH SYSTEM IS FROM SITE,I3,8H TO SITE,I3,            EQICC99C
     21H.)                                                                         EQIC1CCC
      GO TO 10C                                                                    EQIC1C1C
C                                                                                  EQIC1020
C     TCC-7                                                                        EQIC1C3C
C     WRITE MESSAGE AND RECEIVE INPUT                                              EQIC1040
    2 WRITE(6,41)                                                                  EQIC1C5C
   41 FORMAT(/24H INSTALL TCC-7 ON SYSTEM//91H SITE NO, VEH TYPE (1=MRC-EQIC1C6C
     1102, 2=MCC-6), VEH NO, SYSTEM NO, TO SITE, SYS TYPE (1=CBL, 2=RR)/EQIC1C7C
     215H XX X XX X XX X)                                                          EQIC1C8C
      READ(5,42)ISITE1,IVEH,IVEHNC,ISYSNC,ISITE2,ISYSTP                            EQIC1C9C
   42 FORMAT(2I2,I3,I2,I3,I2)                                                      EQIC11CC
      WRITE(6,43)ISITE1,IVEH,IVEHNO,ISYSNO,ISITE2,ISYSTP                           EQIC111C
   43 FORMAT(I3,I2,I3,I2,I3,I2)                                                    EQIC112C
C     IS VEHICLE AT SITE OR IN TRANSIT                                            EQIC113C
      GO TO(5C,51),IVEH                                                            EQIC1140
C     MRC-102                                                                     EQIC115C
   5C NUM2=3                                                                       EQIC116C
      IF((IM1C2(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100-ISITE1)12,53,12EQIC117C
   53 IF(IM1C2(IVEHNO)-(IM102(IVEHNO)/10)*10)55,55,16                              EQIC1180
C     MCC-6                                                                       EQIC119C
   51 NUM2=2                                                                       EQIC12CC
      IF((IMCC6(IVEHNO)-(IMCC6(IVEHNO)/10000)*10000)/100-ISITE1)12,58,12EQIC121C
   58 IF(IMCC6(IVEHNO)-(IMCC6(IVEHNO)/10)*10)55,55,16                              EQIC1220
C     DOES SYSTEM EXIST AT SITE?                                                  EQIC1230
   55 GO TO(59,6C),ISYSTP                                                          EQIC124C
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C       CBL SYSTEM                                                              EQIC1250
   59 CALL SYSOP(ICBSYS,ISYSNO,ISITE1,ISITE2,NUM4,10,IFROM,ITO,II)              EQIO126C
       GO TO 61                                                                 EQIO1270
C       RR SYSTEM                                                               EQIO1280
   6C CALL SYSOP(IRRSYS,ISYSNO,ISITE1,ISITE2,NUM4,50,IFROM,ITO,II)              EQIO129C
   61 IF(NUM4-3)62,20,20                                                        EQIO1300
C       IS EQUIPMENT CONNECTED TC SYSTEM ALREACY                                EQIO1310
   62 J=ISYSNO*100+ISITE2                                                       EQIO1320
       DO 63 I=1,56                                                             EQIO1330
       IF((ITCC7(I)-(ITCC7(I)/100000)*100000)/100-J)63,64,63                    EQIO1340
   64 IVEHNU=(ITCC7(I)-(ITCC7(I)/10000000)*10000000)/100000                     EQIO1350
       IVEHTP=ITCC7(I)/10000000                                                 EQIO1360
       IF(IVEHTP-1)65,65,66                                                     EQIO1370
C       MRC-102                                                                 EQIC1380
   65 NUM5=3                                                                    EQIC1390
       IF((IM102(IVEHNU)-(IM102(IVEHNU)/10000)*10000)/100-ISITE1)63,67,63       EQIO1400
C       MCC-6                                                                   EQIO141C
   66 NUM5=2                                                                    EQIO142C
       IF((IMCC6(IVEHNU)-(IMCC6(IVEHNU)/10000)*10000)/100-ISITE1)63,67,63       EQIO1430
   67 WRITE(6,27)EQUIP(NUMB),VEHID(NUM5),IVEHNO                                 EQIO1440
       GO TO 100                                                                EQIO1450
   63 CONTINUE                                                                  EQIO1460
C       IS TCC-7 AVAILABLE AND OPERATICNAL?                                     EQIC147C
       GO TO(68,69),IVEH                                                        EQIO1480
C       MRC-102                                                                 EQIO1490
   68 K=IVEHNO                                                                  EQIO1500
       IF((ITCC7(K)-(ITCC7(K)/100000)*100000)/100)73,73,71                      EQIC1510
   73 IF((ITCC7(K)-(ITCC7(K)/100)*100)/10)77,77,38                              EQIO1520
C       MCC-6                                                                   EQIO153C
   69 IBOT=21+2*IVEHNO                                                          EQIO154C
       ITOP=IBOT+1                                                              EQIO1550
   76 DO 72 K=IBOT,ITOP                                                         EQIO1560
       IF((ITCC7(K)-(ITCC7(K)/100000)*100000)/100)70,70,72                      EQIO1570
   72 CONTINUE                                                                  EQIO1580
       GO TO 71                                                                 EQIO1590
   7C IF((ITCC7(K)-(ITCC7(K)/100)*100)/10)77,77,74                              EQIO16C0
   74 IF(K-ITOP)75,38,38                                                        EQIO1610
   75 IBOT=K+1                                                                  EQIO162C
       GO TO 76                                                                 EQIO1630
C       SCHEDULE INSTALLATION EVENT AND CHANGE TCC-7 UNIT TO REFLECT            EQIO1640
C       INSTALLATION                                                            EQIO1650
   77 IEVCAL(100)=32000+K                                                       EQIC166C
       ITCC7(K)=(ITCC7(K)/10)*10+100*J+ISYSTP                                   EQIO1670
   92 CALL GAUSS(IX,5.,15.,TIME1)                                               EQIC168C
       IF(TIME1)92,78,78                                                        EQIO169C
C                                                                               EQIC17CC
C       GRC-26                                                                  EQIC171C
C       WRITE MESSAGE AND RECEIVE INPUT                                         EQIC172C
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      3 WRITE(6,80)                                                          EQI01730
     80 FORMAT(/25H INSTALL GRC-26 ON SYSTEM//36H SITE NO, VEH NO, SYSTEM    EQI01740
       1NO, TO SITE/11H XX XX X XX)                                          EQI01750
        READ(5,81)ISITE1,IVEHNO,ISYSNO,ISITE2                               EQI01760
     81 FORMAT(I2,I3,I2,I3)                                                 EQI01770
        WRITE(6,82)ISITE1,IVEHNO,ISYSNO,ISITE2                              EQI01780
     82 FORMAT(2I3,I2,I3)                                                   EQI01790
        NUM2=4                                                              EQI01800
C       IS VEHICLE AT SITE OR IN TRANSIT?                                   EQI01810
        IF((IV26(IVEHNO)-(IV26(IVEHNO)/10000)*10000)/100-ISITE1)12,83,12    EQI01820
     83 IF(IV26(IVEHNO)-(IV26(IVEHNO)/10)*10)84,84,16                       EQI01830
C       DOES SYSTEM EXIST AT SITE?                                          EQI01840
     84 CALL SYSOP(IHFSYS,ISYSNO,ISITE1,ISITE2,NUM4,IFROM,ITO,II)           EQI01850
        IF(NUM4-3)85,20,20                                                  EQI01860
C       IS EQUIPMENT CONNECTED TO A SYSTEM ALREADY                          EQI01870
     85 J=ISYSNO*100+ISITE2                                                 EQI01880
        DO 86 I=1,21                                                        EQI01890
        IF((IGRC26(I)-(IGRC26(I)/100000)*100000)/100-J)86,87,86             EQI01900
     87 IF((IV26(I)-(IV26(I)/10000)*10000)/100-ISITE1)86,88,86              EQI01910
     88 WRITE(6,27)EQUIP(NUMB),VEHID(4),I                                   EQI01920
        GO TO 100                                                           EQI01930
     86 CONTINUE                                                            EQI01940
C       IS GRC-26 AVAILABLE AND OPERATIONAL?                                EQI01950
        IF((IGRC26(IVEHNO)-(IGRC26(IVEHNO)/100000)*100000)/100)89,89,71     EQI01960
     89 IF((IGRC26(IVEHNO)-(IGRC26(IVEHNO)/100)*100)/10)90,90,38            EQI01970
C       SCHEDULE INSTALLATION EVENT AND CHANGE GRC-26 UNIT TO REFLECT       EQI01980
C       INSTALLATION                                                        EQI01990
     90 IEVCAL(100)=33000+IVEHNO                                            EQI02000
        IGRC26(IVEHNO)=(IGRC26(IVEHNO)/10)*10+100*J+3                       EQI02010
     91 CALL GAUSS(IX,5.,15.,TIME1)                                         EQI02020
        IF(TIME1)91,78,78                                                   EQI02030
C                                                                           EQI02040
C                                                                           EQI02050
C       IS THERE AN EVENT IN FUTURE EVENTS TABLE CALLING FOR INSTALLATION   EQI02060
C       OF EQUIPMENT ON SAME SYSTEM                                         EQI02070
      4 IEQTP=NUMB-3                                                        EQI02080
        IEQNO=IEVCUR-(IEVCUR/1000)*1000                                     EQI02090
C       GO TO EQUIPMENT TYPE                                                EQI02100
        GO TO(101,102,103),IEQTP                                            EQI02110
    101 IDUM4=IGRC50(IEQNO)                                                 EQI02120
        GO TO 104                                                           EQI02130
    102 IDUM4=ITCC7(IEQNO)                                                  EQI02140
        GO TO 104                                                           EQI02150
    103 IDUM4=IGRC26(IEQNO)                                                 EQI02160
    104 IVEHTP=IDUM4/10000000                                               EQI02170
        IVEHNO=(IDUM4-(IDUM4/10000000)*10000000)/100000                     EQI02180
        ISYSNO=(IDUM4-(IDUM4/100000)*100000)/10000                          EQI02190
        ISITE1=(IDUM4-(IDUM4/10000)*10000)/100                              EQI02200
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      ISYSTP=IDUM4-(IDUM4/10)*10                                        EQI02210
C     GO TO VEHICLE TYPE                                                EQI02220
      GO TO(105,106,107,108),IVEHTP                                     EQI02230
  105 ISITE2=(IM102(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100            EQI02240
      NUM2=3                                                            EQI02250
      GO TO 109                                                         EQI02260
  106 ISITE2=(IM103(IVEHNO)-(IM103(IVEHNO)/10000)*10000)/100            EQI02270
      NUM2=1                                                            EQI02280
      GO TO 109                                                         EQI02290
  107 ISITE2=(IMCC6(IVEHNO)-(IMCC6(IVEHNO)/10000)*10000)/100            EQI02300
      NUM2=2                                                            EQI02310
      GO TO 109                                                         EQI02320
  108 ISITE2=(IV26(IVEHNO)-(IV26(IVEHNO)/10000)*10000)/100              EQI02330
      NUM2=4                                                            EQI02340
C     DETERMINE IF THERE EXISTS AN EVENT IN FUTURE EVENTS CALENDER      EQI02350
C     TO INSTALL EQUIPMENT ON SAME SYSTEM                               EQI02360
  109 CALL CKEVNT(ISITE1,ISITE2,ISYSTP,ISYSNO,IRESLT)                   EQI02370
C     WRITE MESSAGE                                                     EQI02380
      WRITE(6,111)EQUIP(IEQTP),VEHID(NUM2),IVEHNO,ISITE2,SYSTYP(ISYSTP),EQI02390
     1ISYSNO,ISITE1,ISITE2                                              EQI02400
  111 FORMAT(/17H INSTALLATION OF ,A8,3HIN ,A8,6HNUMBER,I3,8H AT SITE,  EQI02410
     1I3,3H ON,A4,10H SYSTEM NO,I2/10H FROM SITE,I3,8H TO SITE,I3,      EQI02420
     219H HAS BEEN COMPLETED)                                           EQI02430
      IF(IRESLT)110,110,100                                             EQI02440
C     WILL THIS EQUIPMENT MAKE THE SYSTEM OPERATIONAL?                  EQI02450
  110 GO TO(112,113,114),IEQTP                                          EQI02460
  112 CALL OP50(ISITE2,ISITE1,ISYSNO,IEQNO)                             EQI02470
      GO TO 100                                                         EQI02480
  113 CALL OP7(ISITE2,ISITE1,ISYSNO,ISYSTP,IEQNO)                       EQI02490
      GO TO 100                                                         EQI02500
  114 CALL OP26(ISITE2,ISITE1,ISYSNO)                                   EQI02510
C                                                                       EQI02520
  100 RETURN                                                            EQI02530
      END                                                               EQI02540


      SUBROUTINE CKEVNT(ISITE1,ISITE2,ISYSTP,ISYSNO,IRESLT)             CKE00010
C                                                                       CKE00020
C     THIS SUBROUTINE DETERMINES IF THERE IS ANY EVENT IN THE FUTURE    CKE00030
C     EVENTS TABLE CALLING FOR INSTALLATION OF EQUIPMENT ON THE SAME    CKE00040
C     SYSTEM AS THE ONE UNDER CONSIDERATION                             CKE00050
C                                                                       CKE00060
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      CKE00070
     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),CKE00080
     2IDUM1(30),IGEN(54),LOCHQ(22)                                      CKE00090
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    CKE00100
C                                                                       CKE00110
      IRESLT=0                                                          CKE00120
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C       FIND SCHEDULED INSTALLATION EVENT IF ANY EXIST                  CKE00130
        DO 1  I=1,100                                                   CKE00140
C       DOES EVENT CALL FOR INSTALLATION?                               CKE00150
        IF(IEVCAL(I)/10000-3)1,2,1                                      CKE00160
    2   IEQTP=(IEVCAL(I)-(IEVCAL(I)/10000)*10000)/1000                  CKE00170
        IEQNO=IEVCAL(I)-(IEVCAL(I)/1000)*1000                           CKE00180
C       GO TO EQUIPMENT TYPE                                            CKE00190
        GO TO(101,102,103),IEQTP                                        CKE00200
  101   IDUM4=IGRC50(IEQNO)                                             CKE00210
        GO TO 104                                                       CKE00220
  102   IDUM4=ITCC7(IEQNO)                                              CKE00230
        GO TO 104                                                       CKE00240
  103   IDUM4=IGRC26(IEQNO)                                             CKE00250
  104   IVEHTP=IDUM4/10000000                                           CKE00260
        IVEHNO=(IDUM4-(IDUM4/10000000)*10000000)/100000                 CKE00270
        ISYSNU=(IDUM4-(IDUM4/100000)*100000)/10000                      CKE00280
        IFROM=(IDUM4-(IDUM4/10000)*10000)/100                           CKE00290
        ISYSTY=IDUM4-(IDUM4/10)*10                                      CKE00300
C       GO TO VEHICLE TYPE                                              CKE00310
        GO TO(105,106,107,108),IVEHTP                                   CKE00320
  105   ITO=(IM102(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100             CKE00330
        GO TO 109                                                       CKE00340
  106   ITO=(IM103(IVEHNO)-(IM103(IVEHNO)/10000)*10000)/100             CKE00350
        GO TO 109                                                       CKE00360
  107   ITO=(IMCC6(IVEHNO)-(IMCC6(IVEHNO)/10000)*10000)/100             CKE00370
        GO TO 109                                                       CKE00380
  108   ITO=(IV26(IVEHNO)-(IV26(IVEHNO)/10000)*10000)/100               CKE00390
C       ARE SYSTEM TYPES THE SAME                                       CKE00400
  109   IF(ISYSTP-ISYSTY)1,110,1                                        CKE00410
C       ARE SYSTEM NUMBERS THE SAME?                                    CKE00420
  110   IF(ISYSNO-ISYSNU)1,111,1                                        CKE00430
C       ARE TO AND FROM SITES THE SAME?                                 CKE00440
  111   IF(IFROM-ISITE1)112,113,112                                     CKE00450
  112   IF(ITO-ISITE1)1,116,1                                           CKE00460
  116   IF(IFROM-ISITE2)1,115,1                                         CKE00470
  113   IF(ITO-ISITE2)1,115,1                                           CKE00480
C       EVENT HAS BEEN FOUND                                            CKE00490
  115   IRESLT=1                                                        CKE00500
        RETURN                                                          CKE00510
    1   CONTINUE                                                        CKE00520
C                                                                       CKE00530
        RETURN                                                          CKE00540
        END                                                             CKE00550
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      SUBROUTINE SYSREM(ISYSTP)                                          SYS00010
C                                                                        SYS00020
CC    THIS SUBROUTINE REMOVES A SYSTEM ON PLAYERS REQUEST. IF ANY        SYS00030
C     EQUIPMENT IS CURRENTLY ON THE SYSTEM IT IS REMOVED FROM IT.        SYS00040
      DOUBLE PRECISION VEHID,EQUIP                                       SYS00050
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),       SYS00060
     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),SYS00070
     2IDUM1(30),IGEN(54),LOCHQ(22)                                       SYS00080
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(69)             SYS00090
C                                                                        SYS00100
      NUM4=0                                                             SYS00110
      GO TO(1,2,3),ISYSTP                                                SYS00120
C                                                                        SYS00130
CC    RR SYSTEM                                                          SYS00140
C     READ INPUT AND PRINT MESSAGE                                       SYS00150
    2 WRITE(6,4)SYSTYP(ISYSTP)                                           SYS00160
    4 FORMAT(/12H DISCONTINUE,A5,7H SYSTEM//13H FROM,TO, NUM/8H XX XX X  SYS00170
     1)                                                                  SYS00180
      READ(5,5)ISITE1,ISITE2,ISYSNO                                      SYS00190
    5 FORMAT(I2,I3,I2)                                                   SYS00200
      WRITE(6,19)ISITE1,ISITE2,ISYSNO                                    SYS00210
   19 FORMAT(2I3,I2)                                                     SYS00220
      ITYPE=1                                                            SYS00230
C     DETERMINE IF SYSTEM EXISTS                                         SYS00240
      CALL SYSOP(IRRSYS,ISYSNO,ISITE1,ISITE2,NUM4,50,IFROM,ITO,II)       SYS00250
      IF(NUM4-3)6,7,6                                                    SYS00260
C     SYSTEM DOES NOT EXIST                                              SYS00270
    7 WRITE(6,8)                                                         SYS00280
    8 FORMAT(/22H SYSTEM DOES NOT EXIST)                                 SYS00290
      GO TO 100                                                          SYS00300
C     REMOVE SYSTEM                                                      SYS00310
    6 IRRSYS(II)=0                                                       SYS00320
C     CHECK EACH GRC-50 TO DETERMINE IF IT IS ON SYSTEM                  SYS00330
      DO 9 I=1,140                                                       SYS00340
      ITO=(IGRC50(I)-(IGRC50(I)/10000)*10000)/100                        SYS00350
      IVEHNO=(IGRC50(I)-(IGRC50(I)/10000000)*10000000)/100000            SYS00360
      IVEHTP=IGRC50(I)/10000000                                          SYS00370
      IF(ITO-ISITE1)10,11,10                                             SYS00380
   10 IF(ITO-ISITE2)9,11,9                                               SYS00390
   11 GO TO(12,13),IVEHTP                                                SYS00400
   12 IFROM=(IM102(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100              SYS00410
      NUM2=3                                                             SYS00420
      GO TO 14                                                           SYS00430
   13 IFROM=(IM103(IVEHNO)-(IM103(IVEHNO)/10000)*10000)/100              SYS00440
      NUM2=1                                                             SYS00450
   14 IF(IFROM-ISITE2)16,15,16                                           SYS00460
   16 IF(IFROM-ISITE1)9,15,9                                             SYS00470
   15 ISYSNU=(IGRC50(I)-(IGRC50(I)/100000)*100000)/10000                 SYS00480
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      IF(ISYSNU-ISYSNO)9,17,9                                                SYS00490
C     REMOVE GRC-50 FROM SYSTEM                                              SYS00500
   17 IGRC50(I)=IGRC50(I)-(ISYSNO*100+ITO)*100                               SYS00510
C     PRINT MESSAGE                                                          SYS00520
      WRITE(6,22)EQUIP(ITYPE),VEHID(NUM2),IVEHNO,IFROM,SYSTYP(ISYSTP),       SYS00530
     1ISYSNO,ISITE1,ISITE2                                                   SYS00540
   22 FORMAT(/A9,3HIN ,A8,6HNUMBER,I3,8H AT SITE,I3,22H HAS BEEN REMOVEDSYS00550
     1 FROM,A4/14H SYSTEM NUMBER,I2,10H FROM SITE,I3,8H TO SITE,I3,1H.)    SYS00560
    9 CONTINUE                                                              SYS00570
      GO TO 23                                                              SYS00580
C                                                                           SYS00590
C     CBL SYSTEM                                                            SYS00600
C     WRITE MESSAGE AND RECEIVE INPUT                                       SYS00610
    1 WRITE(6,4)SYSTYP(ISYSTP)                                              SYS00620
      READ(5,5)ISITE1,ISITE2,ISYSNO                                         SYS00630
      WRITE(6,19)ISITE1,ISITE2,ISYSNO                                       SYS00640
C     DETERMINE IF SYSTEM EXISTS                                            SYS00650
      CALL SYSOP(ICBSYS,ISYSNO,ISITE1,ISITE2,NUM4,10,IFROM,ITO,II)          SYS00660
      IF(NUM4-3)45,7,45                                                     SYS00670
C     REMOVE SYSTEM                                                         SYS00680
   45 ICBSYS(II)=0                                                          SYS00690
C     CHECK EACH TCC-7 TO DETERMINE IF IT IS ON SYSTEM                      SYS00700
   23 ITYPE=2                                                               SYS00710
      DO 24 J=1,56                                                          SYS00720
      ITO=(ITCC7(J)-(ITCC7(J)/10000)*10000)/100                             SYS00730
      IVEHNO=(ITCC7(J)-(ITCC7(J)/10000000)*10000000)/100000                 SYS00740
      IVEHTP=ITCC7(J)/10000000                                              SYS00750
      IF(ITO-ISITE1)25,26,25                                                SYS00760
   25 IF(ITO-ISITE2)24,26,24                                                SYS00770
   26 GO TO(28,29,29),IVEHTP                                                SYS00780
   28 IFROM=(IM102(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100                 SYS00790
      NUM2=3                                                                SYS00800
      GO TO 30                                                              SYS00810
   29 IFROM=(IMCC6(IVEHNO)-(IMCC6(IVEHNO)/10000)*10000)/100                 SYS00820
      NUM2=2                                                                SYS00830
   30 IF(IFROM-ISITE2)32,31,32                                              SYS00840
   32 IF(IFROM-ISITE1)24,31,24                                              SYS00850
   31 ISYSNU=(ITCC7(J)-(ITCC7(J)/100000)*100000)/10000                      SYS00860
      IF(ISYSNU-ISYSNO)24,33,24                                             SYS00870
   33 IF(ITCC7(J)-(ITCC7(J)/10)*10-ISYSTP)24,34,24                          SYS00880
C     REMOVE TCC-7 FROM SYSTEM                                              SYS00890
   34 ITCC7(J)=ITCC7(J)-(ISYSNO*100+ITO)*100                                SYS00900
      WRITE(6,22)EQUIP(ITYPE),VEHID(NUM2),IVEHNO,IFROM,SYSTYP(ISYSTP),      SYS00910
     1ISYSNO,ISITE1,ISITE2                                                  SYS00920
   24 CONTINUE                                                              SYS00930
   47 WRITE(6,46)SYSTYP(ISYSTP),ISYSNO,ISITE1,ISITE2                        SYS00940
   46 FORMAT(/A5,14H SYSTEM NUMBER,I2,10H FROM SITE,I3,8H TO SITE,I3,       SYS00950
     118H HAS BEEN REMOVED.)                                                SYS00960
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      GO TO 100                                                          SYS00970
C                                                                        SYS00980
C     H-F SYSTEM                                                         SYS00990
C     WRITE MESSAGE AND RECEIVE INPUT                                    SYS01000
    3 WRITE(6,4)SYSTYP(ISYSTP)                                           SYS01010
      READ(5,5)ISITE1,ISITE2,ISYSNO                                      SYS01020
      WRITE(6,19)ISITE1,ISITE2,ISYSNO                                    SYS01030
      ITYPE=3                                                            SYS01040
C     DETERMINE IF SYSTEM EXISTS                                         SYS01050
      CALL SYSOP(IHFSYS,ISYSNO,ISITE1,ISITE2,NUM4,20,IFROM,ITO,II)       SYS01060
      IF(NUM4-3)35,7,35                                                  SYS01070
C     REMOVE SYSTEM                                                      SYS01080
   35 IHFSYS(II)=0                                                       SYS01090
C     CHECK EACH GRC-26 TO DETERMINE IF IT IS ON SYSTEM                  SYS01100
      DO 36 I=1,21                                                       SYS01110
      ITO=(IGRC26(I)-(IGRC26(I)/10000)*10000)/100                        SYS01120
      IF(ITO-ISITE1)37,38,37                                             SYS01130
   37 IF(ITO-ISITE2)36,38,36                                             SYS01140
   38 IFROM=(IV26(I)-(IV26(I)/10000)*10000)/100                          SYS01150
      NUM2=4                                                             SYS01160
      IF(IFROM-ISITE2)39,40,39                                           SYS01170
   39 IF(IFROM-ISITE1)36,40,36                                           SYS01180
   40 ISYSNU=(IGRC26(I)-(IGRC26(I)/100000)*100000)/10000                 SYS01190
      IF(ISYSNU-ISYSNO)36,41,36                                          SYS01200
C     REMOVE GRC-26 FROM SYSTEM                                          SYS01210
   41 IGRC26(I)=IGRC26(I)-(ISYSNO*100+ITO)*100                           SYS01220
      WRITE(6,22)EQUIP(ITYPE),VEHID(NUM2),IVEHNO,IFROM,SYSTYP(ISYSTP),   SYS01230
     1ISYSNO,ISITE1,ISITE2                                               SYS01240
   36 CONTINUE                                                           SYS01250
      GO TO 47                                                           SYS01260
C                                                                        SYS01270
  100 RETURN                                                             SYS01280
      END                                                                SYS01290


      SUBROUTINE SYINST(ISYSTP)                                          SYI00010
C                                                                        SYI00020
C     THIS SUBROUTINE INSTALLS A SYSTEM ON PLAYERS REQUEST               SYI00030
      DOUBLE PRECISION VEHID,EQUIP                                       SYI00040
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),       SYI00050
     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),SYI00060
     2IDUM1(30),IGEN(54),LOCHQ(22)                                       SYI00070
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(69)             SYI00080
C                                                                        SYI00090
      NUM4=0                                                             SYI00100
C     PRINT MESSAGE AND RECEIVE INPUT                                    SYI00110
      WRITE(6,4)SYSTYP(ISYSTP)                                           SYI00120
    4 FORMAT(/9H INSTALL ,A4,6HSYSTEM//17H FROM, TO, NUMBER/8H XX XX X)  SYI00130
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      READ(5,5)IFROM,ITO,ISYSNO                                          SYI00140
    5 FORMAT(I2,I3,I2)                                                   SYI00150
      WRITE(6,6)IFROM,ITO,ISYSNO                                         SYI00160
    6 FORMAT(2I3,I2)                                                     SYI00170
C     GO TO SYSTEM TYPE                                                  SYI00180
      GO TO(1,2,3),ISYSTP                                                SYI00190
C                                                                        SYI00200
C     CBL SYSTEM                                                         SYI00210
C     DOES SYSTEM ALREADY EXIST?                                         SYI00220
    1 CALL SYSOP(ICBSYS,ISYSNO,IFROM,ITO,NUM4,10,K,KK,II)                SYI00230
      IF(NUM4-3)7,8,7                                                    SYI00240
C     SYSTEM ALREADY EXISTS                                              SYI00250
    7 WRITE(6,9)                                                         SYI00260
    9 FORMAT(/22H SYSTEM ALREADY EXISTS)                                 SYI00270
      GO TO 100                                                          SYI00280
C     FIND FIRST CBL SYSTEM UNIT IN ARRAY NOT BEING USED                 SYI00290
    8 DO 10 I=1,10                                                       SYI00300
      IF(ICBSYS(I))10,11,10                                              SYI00310
   10 CONTINUE                                                           SYI00320
   15 WRITE(6,12)SYSTYP(ISYSTP)                                          SYI00330
   12 FORMAT(/25H GAME CANNOT ACCEPT MORE ,A4,7HSYSTEMS)                 SYI00340
      GO TO 100                                                          SYI00350
   11 ICBSYS(I)=ISYSNO*100000+IFROM*1000+ITO*10+1                        SYI00360
   13 WRITE(6,14)SYSTYP(ISYSTP),ISYSNO,IFROM,ITO                         SYI00370
   14 FORMAT(/A5,13HSYSTEM NUMBER,I2,10H FROM SITE,I3,8H TO SITE,I3,     SYI00380
     110H HAS BEEN /29H INSTALLED (NON-OPERATIONAL).)                    SYI00390
      GO TO 100                                                          SYI00400
C                                                                        SYI00410
C     RR SYSTEM                                                          SYI00420
    2 CALL SYSOP(IRRSYS,ISYSNO,IFROM,ITO,NUM4,50,K,KK,II)                SYI00430
      IF(NUM4-3)7,16,7                                                   SYI00440
   16 DO 17 I=1,50                                                       SYI00450
      IF(IRRSYS(I))17,18,17                                              SYI00460
   17 CONTINUE                                                           SYI00470
      GO TO 15                                                           SYI00480
   18 IRRSYS(I)=ISYSNO*100000+IFROM*1000+ITO*10+1                        SYI00490
      GO TO 13                                                           SYI00500
C                                                                        SYI00510
C     HF SYSTEM                                                          SYI00520
    3 CALL SYSOP(IHFSYS,ISYSNO,IFROM,ITO,NUM4,20,K,KK,II)                SYI00530
      IF(NUM4-3)7,19,7                                                   SYI00540
   19 DO 20 I=1,20                                                       SYI00550
      IF(IHFSYS(I))20,21,20                                              SYI00560
   20 CONTINUE                                                           SYI00570
      GO TO 15                                                           SYI00580
   21 IHFSYS(I)=ISYSNO*100000+IFROM*1000+ITO*10+1                        SYI00590
      GO TO 13                                                           SYI00600
C                                                                        SYI00610
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  100 RETURN                                                            SYI00620
      END                                                               SYI00630

      SUBROUTINE VEHMOV(IVEHTP)                                         VEH00010
C                                                                       VEH00020
CC    THIS SUBROUTINE PROCESSES THE MOVING AND ARRIVAL OF COMMUNICATIONSVEH00030
CC    VEHICLES                                                          VEH00040
C                                                                       VEH00050
      DOUBLE PRECISION VEHID,EQUIP                                      VEH00060
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),      VEH00070
     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),VEH00080
                                                                        VEH00090
     2IDUM1(30),IGEN(54),LOCHQ(22)                                      VEH00100
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(69)            VEH00110
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                    VEH00120
      COMMON/C6/IX                                                      VEH00130
C                                                                       VEH00140
C     GO TO MOVEMENT OR ARRIVAL SECTION                                 VEH00150
      IF(IVEHTP-5)1,1,2                                                 VEH00160
    1 IF(IVEHTP-5)70,60,60                                              VEH00170
   60 WRITE(6,61)                                                       VEH00180
   61 FORMAT(/15H MOVE GENERATOR//34H VEH NUMBER, AT SITE, MOVE TO SITE/VEH00190
     19H XX XX XX)                                                      VEH00200
      GO TO 62                                                          VEH00210
C     MOVEMENT                                                          VEH00220
C     PRINT MESSAGE AND RECEIVE INPUT                                   VEH00230
   70 WRITE(6,3)VEHID(IVEHTP)                                           VEH00240
    3 FORMAT(/5H MOVE,A9//34H VEH NUMBER, AT SITE, MOVE TO SITE/        VEH00250
     19H XX XX XX)                                                      VEH00260
   62 READ(5,4)IVEHNO,IFROM,ITO                                         VEH00270
    4 FORMAT(I2,2I3)                                                    VEH00280
      WRITE(6,5)IVEHNO,IFROM,ITO                                        VEH00290
    5 FORMAT(3I3)                                                       VEH00300
C     GO TO VEHICLE TYPE                                                VEH00310
      GO TO (6,7,8,9,10),IVEHTP                                         VEH00320
    6 IV=IM103(IVEHNO)                                                  VEH00330
      GO TO 11                                                          VEH00340
    7 IV=IMCC6(IVEHNO)                                                  VEH00350
      GO TO 11                                                          VEH00360
    8 IV=IM102(IVEHNO)                                                  VEH00370
      GO TO 11                                                          VEH00380
    9 IV=IV26(IVEHNO)                                                   VEH00390
      GO TO 11                                                          VEH00400
   10 IV=IGEN(IVEHNO)                                                   VEH00410
C     IS VEHICLE AT SITE?                                               VEH00420
   11 IF((IV-(IV/10000)*10000)/100-IFROM)12,64,12                       VEH00430
   12 WRITE(6,20)IVEHNO,IFROM                                           VEH00440
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   20 FORMAT(/15H VEHICLE NUMBER,I3,23H IS NOT LOCATED AT SITE,I3)       VEH00450
      GO TO 100                                                          VEH00460
C     IS VEHICLE OPERATIONAL?                                           VEH00470
   64 IF((IV-(IV/100)*100)/10)13,13,65                                  VEH00480
   65 WRITE(6,66)IVEHNO                                                 VEH00490
   66 FORMAT(/15H VEHICLE NUMBER,I3,14H IS DEADLINED.)                  VEH00500
      GO TO 100                                                         VEH00510
C     IS VEHICLE IN TRANSIT?                                            VEH00520
   13 IF(IV-(IV/10)*10)14,14,80                                         VEH00530
   80 WRITE(6,21)IVEHNO                                                 VEH00540
   21 FORMAT(/15H VEHICLE NUMBER,I3,39H IS IN TRANSIT AND CANNOT BE CONTVEH00550
     1ACTED.)                                                           VEH00560
      GO TO 100                                                         VEH00570
C     DOES TO SITE EXIST?                                               VEH00580
   14 IF(LOCSIT(ITO))15,15,16                                           VEH00590
   15 WRITE(6,22)ITO                                                    VEH00600
   22 FORMAT(/12H SITE NUMBER,I3,15H DOES NOT EXIST)                    VEH00610
      GO TO 100                                                         VEH00620
C     IS ALL EQUIPMENT FREE?                                            VEH00630
   16 GO TO(23,24,25,26,40),IVEHTP                                      VEH00640
C     MRC-103                                                           VEH00650
   23 IBOT=IVEHNO*3+42                                                  VEH00660
      ITOP=IBOT+2                                                       VEH00670
      DO 28 I=IBOT,ITOP                                                 VEH00680
      IF((IGRC50(I)-(IGRC50(I)/100000)*100000)/100)29,28,29             VEH00690
   28 CONTINUE                                                          VEH00700
      GO TO 40                                                          VEH00710
   29 WRITE(6,30)VEHID(IVEHTP),IVEHNO                                   VEH00720
   30 FORMAT(/A9,6HNUMBER,I3,30H STILL HAS CONNECTED EQUIPMENT)         VEH00730
      GO TO 100                                                         VEH00740
C     MCC-6                                                             VEH00750
   24 IBOT=IVEANO*2+21                                                  VEH00760
      ITOP=IBOT+1                                                       VEH00770
      DO 31 I=IBOT,ITOP                                                 VEH00780
      IF((ITCC7(I)-(ITCC7(I)/100000)*100000)/100)29,31,29               VEH00790
   31 CONTINUE                                                          VEH00800
      GO TO 40                                                          VEH00810
C     MRC - 102                                                         VEH00820
   25 IBOT=IVEHNO*2-1                                                   VEH00830
      ITOP=IBOT+1                                                       VEH00840
      DO 32 I=IBOT,ITOP                                                 VEH00850
      IF((IGRC50(I)-(IGRC50(I)/100000)*100000)/100)29,32,29             VEH00860
   32 CONTINUE                                                          VEH00870
      IF((ITCC7(IVEHNO)-(ITCC7(IVEHNO)/100000)*100000)/100)29,40,29     VEH00880
C     GRC-26                                                            VEH00890
   26 IF((IGRC26(IVEHNO)-(IGRC26(IVEHNO)/100000)*100000)/100)29,40,29   VEH00900
C     CALCULATE DISATNCE TO 'TO' SITE (PLUS 25 PERCENT)                 VEH00910
   40 XDIST=(LOCSIT(IFROM)-(LOCSIT(IFROM)/1000000)*1000000)/1000-       VEH00920
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     1(LOCSIT(ITO)-(LOCSIT(ITO)/1000000)*1000000)/1000                  VEH00930
      YDIST=(LOCSIT(IFROM)-(LOCSIT(IFROM)/1000)*1000)-(LOCSIT(ITO)-     VEH00940
     1(LOCSIT(ITO)/1000)*1000)                                          VEH00950
      IDIST=SQRT(XDIST**2+YDIST**2)*(1.25/10.)                          VEH00960
C     WILLVEHICLE BREAKDOWN?                                           VEH00970
      IF(IV/10000-IDIST)41,41,42                                        VEH00980
C     VEHICLE BREAKS DOWN                                              VEH00990
C     CALCULATE TIME OF BREAKDOWN (18 KM/HR)                           VEH01000
   41 TIME1=(IDIST-IV/10000)*(60./18.)                                  VEH01010
  101 CALL GAUSS(IX,TIME1/3.,TIME1,FAIL)                               VEH01020
      IF(FAIL)101,102,102                                               VEH01030
  102 IFAIL=FAIL                                                        VEH01040
C     SCHEDULE BREAKDOWN EVENT                                         VEH01050
      IEVCAL(100)=50000+IVEHTP*1000+IVEHNO                              VEH01060
      JEVCAL(100)=ITIME+IFAIL                                           VEH01070
      CALL ORDERT                                                       VEH01080
C     STORE DISTANCE REMAINING TO DESTINATION AND CHANGE TRANSIT FLAG  VEH01090
      IDUM2=IV-(IV/10000)*10000+(IDIST-IV/10000)*10000+1                VEH01100
C     CHANGE LOCATION                                                  VEH01110
      IDUM2=IDUM2-IFROM*100+ITO*100                                     VEH01120
   49 GO TO (43,44,45,46,47),IVEHTP                                     VEH01130
   43 IM103(IVEHNO)=IDUM2                                               VEH01140
      GO TO 48                                                          VEH01150
   44 IMCC6(IVEHNO)=IDUM2                                               VEH01160
      GO TO 49                                                          VEH01170
   45 IM102(IVEHNO)=IDUM2                                               VEH01180
      GO TO 48                                                          VEH01190
   46 IV26(IVEHNO)=IDUM2                                                VEH01200
      GO TO 48                                                          VEH01210
   47 IGEN(IVEHNO)=IDUM2                                                VEH01220
      GO TO 48                                                          VEH01230
C     NO VEHICLE BREAKDOWN - SCHEDULE ARRIVAL EVENT                    VEH01240
   42 TIME1=IDIST*60./18.                                               VEH01250
  103 CALL GAUSS(IX,TIME1/3.,TIME1,ARRIV)                               VEH01260
      IF(ARRIV)103,104,104                                              VEH01270
  104 IARRIV=ARRIV                                                      VEH01280
      IEVCAL(100)=40000+IVEHTP*1000+IVEHNO                              VEH01290
      JEVCAL(100)=ITIME+IARRIV                                          VEH01300
      CALL ORDERT                                                       VEH01310
C     SUBTRACT DISTANCE TRAVELED FROM NEXT BREAKDOWN DISTANCE AND CHANGEVEH01320
C     TRANSIT FLAG                                                     VEH01330
      IDUM2=IV-IDIST*10000+1                                            VEH01340
C     CHANGE LOCATION                                                  VEH01350
      IDUM2=IDUM2-IFROM*100+ITO*100                                     VEH01360
      GO TO 49                                                          VEH01370
C     PRINT MESSAGE                                                    VEH01380
   48 WRITE(6,50)IVEHNO,IFROM,ITO                                       VEH01390
   50 FORMAT(/15H VEHICLE NUMBER,I3,14H HAS LEFT SITE,I3,26H AND IS PROCVEH01400
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     1EEDING TO SITE,I3)                                                    VEH01410
      GO TO 100                                                             VEH01420
C                                                                           VEH01430
C                                                                           VEH01440
C     ARRIVAL                                                               VEH01450
    2 IVEHTP=IVEHTP-5                                                       VEH01460
      IVEHNO=IEVCUR-(IEVCUR/1000)*1000                                      VEH01470
C     CHANGE TRANSIT FLAG AND DETERMINE SITE                                VEH01480
      GO TO(51,52,53,54,55),IVEHTP                                          VEH01490
   51 IM103(IVEHNO)=IM103(IVEHNO)-1                                         VEH01500
      ISITE=(IM103(IVEHNO)-(IM103(IVEHNO)/10000)*10000)/100                 VEH01510
      GO TO 56                                                              VEH01520
   52 IMCC6(IVEHNO)=IMCC6(IVEHNO)-1                                         VEH01530
      ISITE=(IMCC6(IVEHNO)-(IMCC6(IVEHNO)/10000)*10000)/100                 VEH01540
      GO TO 56                                                              VEH01550
   53 IM102(IVEHNO)=IM102(IVEHNO)-1                                         VEH01560
      ISITE=(IM102(IVEHNO)-(IM102(IVEHNO)/10000)*10000)/100                 VEH01570
      GO TO 56                                                              VEH01580
   54 IV26(IVEHNO)=IV26(IVEHNO)-1                                           VEH01590
      ISITE=(IV26(IVEHNO)-(IV26(IVEHNO)/10000)*10000)/100                   VEH01600
      GO TO 56                                                              VEH01610
   55 IGEN(IVEHNO)=IGEN(IVEHNO)-1                                           VEH01620
      ISITE=(IGEN(IVEHNO)-(IGEN(IVEHNO)/10000)*10000)/100                   VEH01630
      WRITE(6,63)IVEHNO,ISITE                                               VEH01640
   63 FORMAT(/17H GENERATOR NUMBER,I3,20H HAS ARRIVED AT SITE,I3)           VEH01650
      GO TO 100                                                             VEH01660
C     PRINT MESSAGE                                                         VEH01670
   56 WRITE(6,57)VEHID(IVEHTP),IVEHNO,ISITE                                 VEH01680
   57 FORMAT(/A9,6HNUMBER,I3,20H HAS ARRIVED AT SITE,I3)                    VEH01690
C                                                                           VEH01700
  100 RETURN                                                                VEH01710
      END                                                                   VEH01720

      SUBROUTINE RANDU(IX,IY,YFL)                                           RAN00010
C                                                                           RAN00020
CC       PURPOSE                                                            RAN00030
CC          COMPUTES UNIFORMLY DISTRIBUTED RANDOM REAL NUMBERS BETWEEN      RAN00040
CC          0 AND 1.0 AND RANDOM INTEGERS BETWEEN ZERO AND                  RAN00050
CC          2**31. EACH ENTRY USES AS INPUT AN INTEGER RANDOM NUMBER        RAN00060
CC          AND PRODUCES A NEW INTEGER AND REAL RANDOM NUMBER.              RAN00070
CC                                                                          RAN00080
CC       DESCRIPTION OF PARAMETERS                                          RAN00090
CC          IX - FOR THE FIRST ENTRY THIS MUST CONTAIN ANY ODD INTEGER      RAN00100
CC               NUMBER WITH NINE OR LESS DIGITS. AFTER THE FIRST ENTRY,    RAN00110
CC               IX SHOULD BE THE PREVIOUS VALUE OF IY COMPUTED BY THIS     RAN00120
CC               SUBROUTINE.                                                RAN00130
C           IY - A RESULTANT INTEGER RANDOM NUMBER REQUIRED FOR THE NEXT    RAN00140
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C                ENTRY TO THIS SUBROUTINE. THE RANGE OF THIS NUMBER IS   RAN00150
C                BETWEEN ZERO AND 2**31                                  RAN00160
C           YFL- THE RESULTANT UNIFORMLY DISTRIBUTED, FLOATING POINT,    RAN00170
C                RANDOM NUMBER IN THE RANGE 0 TO 1.0                     RAN00180
C                                                                        RAN00190
      IY=IX*65539                                                        RAN00200
      IF(IY)5,6,6                                                        RAN00210
    5 IY=IY+2147483647+1                                                 RAN00220
    6 YFL=IY                                                             RAN00230
      YFL=YFL*.4656613E-9                                                RAN00240
      RETURN                                                             RAN00250
      END                                                                RAN00260

      SUBROUTINE GAUSS(IX,S,AM,V)                                        GAU00010
C                                                                        GAU00020
C                                                                        GAU00030
C        PURPOSE                                                         GAU00040
C           COMPUTES A NORMALLY DISTRIBUTED RANDOM NUMBER WITH A GIVEN   GAU00050
C           MEAN AND STANDARD DEVIATION                                  GAU00060
C                                                                        GAU00070
C        DESCRIPTION OF PARAMETERS                                       GAU00080
C           IX -IX MUST CONTAIN AN ODD INTEGER NUMBER WITH NINE OR       GAU00090
C               LESS DIGITS ON THE FIRST ENTRY TO GAUSS. THEREAFTER      GAU00100
C               IT WILL CONTAIN A UNIFORMLY DISTRIBUTED INTEGER RANDOM   GAU00110
C               NUMBER GENERATED BY THE SUBROUTINE FOR USE ON THE NEXT   GAU00120
C               ENTRY TO THE SUBROUTINE.                                 GAU00130
C           S  -THE DESIRED STANDARD DEVIATION OF THE NORMAL             GAU00140
C               DISTRIBUTION.                                            GAU00150
C           AM -THE DESIRED MEAN OF THE NORMAL DISTRIBUTION              GAU00160
C           V  -THE VALUE OF THE COMPUTED NORMAL RANDOM VARIABLE         GAU00170
C                                                                        GAU00180
      A=0.0                                                              GAU00190
      DO 50 I=1,12                                                       GAU00200
      CALL RANDU(IX,IY,Y)                                                GAU00210
      IX=IY                                                              GAU00220
   50 A=A+Y                                                              GAU00230
      V=(A-6.0)*S+AM                                                     GAU00240
      RETURN                                                             GAU00250
      END                                                                GAU00260

      SUBROUTINE ORDERT                                                  ORD00010
C                                                                        ORD00020
C     THIS SUBROUTINE ORDERS THE EVENTS IN THE FUTURE EVENTS TABLE       ORD00030
C     BY TIME                                                            ORD00040
C                                                                        ORD00050
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                     ORD00060
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C                                                                       ORD00070
C     DETERMINE NUMBER OF EVENTS IN TABLE                               ORD00080
      DO 1 J=1,100                                                      ORD00090
      IF(IEVCAL(J))2,2,1                                                ORD00100
    1 CONTINUE                                                          ORD00110
    2 IF(IEVCAL(100))3,3,4                                              ORD00120
    4 IEVCAL(J)=IEVCAL(100)                                             ORD00130
      JEVCAL(J)=JEVCAL(100)                                             ORD00140
      IEVCAL(100)=0                                                     ORD00150
      JEVCAL(100)=0                                                     ORD00160
      GO TO 5                                                           ORD00170
    3 J=J-1                                                             ORD00180
C     SET INDEX OF ENTRY IN TABLE, DEFINE DUMMIES, AND BEGIN MAIN LOOP  ORD00190
    5 IBOT=1                                                            ORD00200
      ITOP=J-1                                                          ORD00210
      DO 8 K=1,ITOP                                                     ORD00220
      IBOT=IBOT+1                                                       ORD00230
      IDUM=IEVCAL(IBOT-1)                                               ORD00240
      JDUM=JEVCAL(IBOT-1)                                               ORD00250
C     CHECK EACH REMAINING ENTRY IN ARRAY AND REPLACE DUMMY IF ENTRY    ORD00260
C     IS SMALLER                                                        ORD00270
      DO 9 I=IBOT,J                                                     ORD00280
      IF(JEVCAL(I).GE.JDUM)GO TO 9                                      ORD00290
      JEVCAL(IBOT-1)=JEVCAL(I)                                          ORD00300
      IEVCAL(IBOT-1)=IEVCAL(I)                                          ORD00310
      JEVCAL(I)=JDUM                                                    ORD00320
      IEVCAL(I)=IDUM                                                    ORD00330
      JDUM=JEVCAL(IBOT-1)                                               ORD00340
      IDUM=IEVCAL(IBOT-1)                                               ORD00350
    9 CONTINUE                                                          ORD00360
    8 CONTINUE                                                          ORD00370
C                                                                       ORD00380
      RETURN                                                            ORD00390
      END                                                               ORD00400


      SUBROUTINE TIME(ITIME,IDAY)
C
C     THIS SUBROUTINE CONVERTS TIME IN SECONDS WHICH IS USED INTERNALLY
C     TO TIME IN DAYS, HOURS, AND MINUTES FOR PLAYER USE
C
      IHOUR=0
      IF(ITIME.LT.IDAY*1440)GO TO 6
      IDAY=IDAY+1
    6 IMIN=ITIME-(IDAY-1)*1440
    9 IF(IMIN.LT.(IHOUR+1)*60)GO TO 8
      IHOUR=IHOUR+1
      GO TO 9
```

```
    8 IMIN=IMIN-IHOUR*60
      IMIN1=IMIN/10
      IMIN2=IMIN-(IMIN/10)*10
      IHOUR1=IHOUR/10
      IHOUR2=IHOUR-(IHOUR/10)*10
C     WRITE DAY AND TIME
      WRITE(6,10)IDAY,IHOUR1,IHOUR2,IMIN1,IMIN2
   10 FORMAT(/' DAY',I3,4X,4I1)
C
      RETURN
      END


      BLOCK DATA                                                          BL000010
C                                                                         BL000020
C     THIS SUBROUTINE INITIALIZES ARRAYS                                  BL000030
C                                                                         BL000040
      DOUBLE PRECISION VEHID,EQUIP                                        BL000050
      COMMON/C1/LOCSIT(30),IM102(22),IM103(32),IMCC6(17),IV26(21),        BL000060
     1IGRC50(140),ITCC7(56),IGRC26(21),IRRSYS(50),IHFSYS(20),ICBSYS(10),BL000070
     1IDUM1(30),IGEN(54),LOCHQ(22)                                        BL000080
      COMMON/C2/VEHID(5),EQUIP(3),SYSTYP(3),STATUS(2),HQ(69)              BL000090
      COMMON/C5/IEVCAL(100),JEVCAL(100),ITIME,IEVCUR                      BL000100
      COMMON/C4/IG50FL(140),IT7FL(56),IG26FL(21),IGENFL(54),ISITFL(30)    BL000110
C                                                                         BL000120
      REAL*8 VEHID/'MRC-103 ','MCC-6   ','MRC-102 ','GRC-26  ','         BL000130
     1'/,EQUIP/'GRC-50  ','TCC-7   ','GRC-26  '/, STATUS*4/'YES ',        BL000140
     2' NO '/,SYSTYP*4/'CBL ',' RR ','H-F '/,HQ*4/'CORP','S MA','IN  ',   BL000150
     3'CORP','S AL','T   ','CORP','S AR','TY  ','21 D','IV M','AIN ',     BL000160
     4'21 D','IV A','LT  ','52 D','IV M','AIN ','52 D','IV A','LT  ',     BL000170
     5'53 D','IV M','AIN ','53 D','IV A','LT  ','25 D','IV M','AIN ',     BL000180
     6'ARM ','CAV ','REG ','312 ','MECH',' BDE','101 ','AVN ','REG ',     BL000190
     7'61 A','RTY ','GP  ','62 A','RTY ','GP  ','63 A','RTY ','GP  ',     BL000200
     8'TGT ','ACQ ','BN  ','SGT ','MSL ','BN  ','MON ','710 ','AASC',     BL000210
     9'MON ','715 ','AASC','51 E','NG B','DE  ','64 A','RTY ','GP  ',     BL000220
     A'RELA','Y SI','TE  '/                                               BL000230
      INTEGER LOCSIT/30*0/,IM102/22*0/,IM103/32*0/,IMCC6/17*0/,           BL000240
     1IV26/21*0/,IRRSYS/50*0/,IHFSYS/20*0/,ICBSYS/10*0/,IGEN/54*0/       BL000250
     2,LOCHQ/284501,645591,459460,729661,736608,765517,811472,696374,     BL000260
     3825351,352392,868354,271470,600411,721702,784555,834402,595513,     BL000270
     4274658,520730,492460,437389,837455/,IEVCAL/100*0/,JEVCAL/100*0/     BL000280
     5,IG50FL/140*0/,IT7FL/56*0/,IG26FL/21*0/,IGENFL/54*0/,ISITFL/30*0/   BL000290
C                                                                         BL000300
      END                                                                 BL000310
```

SAMPLE TERMINAL PRINTOUT

The following pages provide an illustration of the general format of the printout at the remote terminal. The sample game segment shown used punched cards for input with the master and generator tables printed offline.

```
INPUT GAMEWORD
XX
11

INPUT ODD RANDUM NUMBER
XXXXXXX
1111111

INPUT IS ENTERED BY CARDS

COMPLETE SYSTEM AND GENERATOR TABLES ARE PRINTED BY HIGH SPEED PRINTER


EQUIPMENT FAILURE
    AN/GRC-50 RADIO IN MRC-103  NUMBER 19 LOCATED AT CORPS ARTY   (SITE  3)
    FAILED. RADIO WAS OPERATING ON SYSTEM NUMBER  1 FROM CORPS ARTY   (SITE  3)
    TO 61 ARTY GP   (SITE 14)

    ESTIMATED REPAIR TIME IS  1 HOURS  7 MIN.

DAY  1    0002

ENTER DECISION
XXX
201
201



REMOVE GRC-50  FROM SYSTEM

SITE NO, SYSTEM NO, TO SITE
XX X XX
 3 1 14
```

```
 3 1 14

GRC-50  IN MRC-103 NUMBER 19 AT SITE  3 HAS BEEN REMOVED FROM RR
SYSTEM NUMBER 1 FROM SITE  3 TO SITE 14.

DAY  1    0002

ENTER DECISION
XXX
301
301



INSTALL GRC-50   ON SYSTEM

SITE NO, VEH TYPE (1=MRC-103, 2=MRC-102), VEH NO, SYSTEM NO, TO SITE
XX X XX X XX
 3 1 24 1 14
 3 1 24 1 14

INSTALLATION OF GRC-50  IN MRC-103 NO 24 LOCATED AT SITE  3
HAS BEGUN.  RR  SYSTEM IS FROM SITE  3 TO SITE 14.

DAY  1    0002

ENTER DECISION
XXX
000
```

```
  0


INSTALLATION OF GRC-50  IN MRC-103 NUMBER 24 AT SITE  3 ON RR  SYSTEM NO 1
FROM SITE 14 TO SITE  3 HAS BEEN COMPLETED

RADIO RELAY SYSTEM NUMBER 1 FROM SITE  3 TO SITE 14 IS NOW OPERATING.

DAY  1    0015

ENTER DECISION
XXX
000
  0


DAY  1    0045

ENTER DECISION
XXX
000
  0


DAY  1    0115

ENTER DECISION
XXX
000
```

```
  0


EQUIPMENT REPAIR
    AN/GRC-50 RADIO IN MRC-103  NUMBER 19 LOCATED AT CORPS ARTY   (SITE  3)
    HAS BEEN REPAIRED.

DAY  1    0133

ENTER DECISION
XXX
402
402


DISCONTINUE  RR  SYSTEM

FROM,TO, NUM
XX XX X
 1  2 1
 1  2 1

GRC-50  IN MRC-103 NUMBER  5 AT SITE  1 HAS BEEN REMOVED FROM RR
SYSTEM NUMBER 1 FROM SITE  1 TO SITE  2.

GRC-50  IN MRC-103 NUMBER 11 AT SITE  2 HAS BEEN REMOVED FROM RR
SYSTEM NUMBER 1 FROM SITE  1 TO SITE  2.

TCC-7   IN MCC-6   NUMBER  5 AT SITE  1 HAS BEEN REMOVED FROM RR
SYSTEM NUMBER 1 FROM SITE  1 TO SITE  2.
```

```
TCC-7   IN MCC-6   NUMBER  9 AT SITE  2 HAS BEEN REMOVED FROM RR
SYSTEM NUMBER 1 FROM SITE  1 TO SITE  2.

 RR  SYSTEM NUMBER 1 FROM SITE  1 TO SITE  2 HAS BEEN REMOVED.

DAY  1    0133

ENTER DECISION
XXX
000
  0



DAY  1    0203

ENTER DECISION
XXX
000
  0



DAY  1    0233

ENTER DECISION
XXX
000
  0



EQUIPMENT FAILURE
    GENERATOR NUMBER  8 LOCATED AT CORPS MAIN   (SITE  1) FAILED.
```

ESTIMATED REPAIR TIME IS 7 HOURS 55 MIN.

DAY 1   0243

ENTER DECISION
XXX
000
  0

DAY 1   0313

ENTER DECISION
XXX
000
  0

EQUIPMENT FAILURE
    AN/GRC-50 RADIO IN MRC-103 NUMBER 1 LOCATED AT CORPS MAIN   (SITE 1)
    FAILED. RADIO WAS OPERATING ON SYSTEM NUMBER 1 FROM CORPS MAIN   (SITE 1)
    TO RELAY SITE   (SITE 23)

    ESTIMATED REPAIR TIME IS 5 HOURS 28 MIN.

DAY 1   0340

ENTER DECISION
XXX
101

SITE	LOCATION	VEHICLES TYPE	NUM	OPER	SYSTEMS FROM	TO	NUM	TYPE	OPER	DEADLINED EQUIP
1	284501									
CORPS MAIN										
		MRC-103	1	YES	1	23	1	RR	NO	GRC-50
					1	23	2	RR	YES	
		MRC-103	2	YES	1	23	3	RR	YES	
					1	23	4	RR	YES	
		MRC-103	3	YES	1	24	1	RR	YES	
					1	24	2	RR	YES	
		MRC-103	4	YES	1	24	3	RR	YES	
					1	10	1	RR	YES	
		MRC-103	5	YES	1	10	2	RR	YES	
		MRC-103	6	YES	1	2	2	RR	YES	
					1	3	1	RR	YES	
		MRC-103	7	YES	1	3	2	RR	YES	
					1	13	1	RR	YES	
		MRC-103	8	YES						
		MRC-103	9	YES						
		MRC-103	10	YES						
		MCC-6	1	YES	1	23	1	RR	NO	
					1	23	2	RR	YES	
		MCC-6	2	YES	1	23	3	RR	YES	
					1	23	4	RR	YES	
		MCC-6	3	YES	1	24	1	RR	YES	
					1	24	2	RR	YES	
		MCC-6	4	YES	1	24	3	RR	YES	
					1	10	1	RR	YES	

```
                  * MCC-6      5   YES  *   1   10   2    RR     YES *
                  * MCC-6      6   YES  *   1    2   2    RR     YES *
                  *                     *   1    3   1    RR     YES *
                  * MCC-6      7   YES  *   1    3   2    RR     YES *
                  *                     *   1   13   1    RR     YES *
                  * MCC-6      8   YES  *                            *
                  * MRC-102    1   YES  *                            *

DAY  1    0340

ENTER DECISION
XXX
601
601



MOVE MRC-103

VEH NUMBER, AT SITE, MOVE TO SITE
XX XX XX
 9  1 23
 9  1 23

VEHICLE NUMBER  9 HAS LEFT SITE  1 AND IS PROCEEDING TO SITE 23

DAY  1    0340

ENTER DECISION
XXX
000
```

```
  0


DAY  1    0410

ENTER DECISION
XXX
000
  0


DAY  1    0440

ENTER DECISION
XXX
000
  0


MRC-103 NUMBER  9 HAS ARRIVED AT SITE 23

DAY  1    0503

ENTER DECISION
XXX
000
  0


EQUIPMENT FAILURE
    AN/TCC-7 MULTIPLEX IN MCC-6    NUMBER 10 LOCATED AT CORPS ALT   (SITE  2)
```

```
    FAILED. MULTIPLEX WAS OPERATING ON  RR SYSTEM NUMBER  1 FROM CORPS ALT    (SITE  2)
    TO 21 DIV ALT   (SITE  5)

    ESTIMATED REPAIR TIME IS  1 HOURS 36 MIN.

DAY  1    0516

ENTER DECISION
XXX
202
202


REMOVE TCC-7 FROM SYSTEM
SITE NO, SYSTEM NO, TO SITE, SYSTEM TYPE (1 = CBL, 2 = RR)
XX X XX X
 2 1  5 2
 2 1  5 2

TCC-7   IN MCC-6   NUMBER 10 AT SITE  2 HAS BEEN REMOVED FROM RR
SYSTEM NUMBER 1 FROM SITE  2 TO SITE  5.

DAY  1    0516

ENTER DECISION
XXX
302
302


INSTALL TCC-7 ON SYSTEM

SITE NO, VEH TYPE (1=MRC-102, 2=MCC-6), VEH NO, SYSTEM NO, TO SITE, SYS TYPE (1=CBL, 2=RR)
```

```
XX X XX X XX X
 2 2 12 1  5 2
 2 2 12 1  5 2

INSTALLATION OF TCC-7   IN MCC-6   NO 12 LOCATED AT SITE  2
HAS BEGUN.  RR  SYSTEM IS FROM SITE  2 TO SITE  5.

DAY  1    0516

ENTER DECISION
XXX
000
  0


INSTALLATION OF TCC-7   IN MCC-6   NUMBER 12 AT SITE  2 ON RR  SYSTEM NO 1
FROM SITE  5 TO SITE  2 HAS BEEN COMPLETED

RR  SYSTEM NUMBER 1 FROM SITE  2 TO SITE  5 IS NOW OPERATING.

DAY  1    0530

ENTER DECISION
XXX
000
  0


EQUIPMENT FAILURE
    AN/TCC-7 MULTIPLEX IN MRC-102  NUMBER 21 LOCATED AT SGT MSL BN  (SITE 18)
```

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13. ABSTRACT

This thesis presents a computer assisted game, based on a current map board exercise at the U. S. Army Signal Center and School, designed to train army officers in the capabilities, organization, and deployment techniques of the Corps Signal Battalion. A team of players using the game direct a simulated signal battalion in a European tactical environment experiencing equipment failures, vehicle failures, and site attacks. The decisions made by the players are similar to those in combat and are entered by means of a remote computer terminal. These decisions include installing and deleting communications systems, connecting and disconnecting equipment, moving vehicles, and establishing communications sites. The computer, acting in the roles of battalion communications personnel, nature, and the enemy, informs the players of its actions by means of the same terminal.

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Army						
Communications						
Computer						
Corps						
Education						
Game						
Simulation						